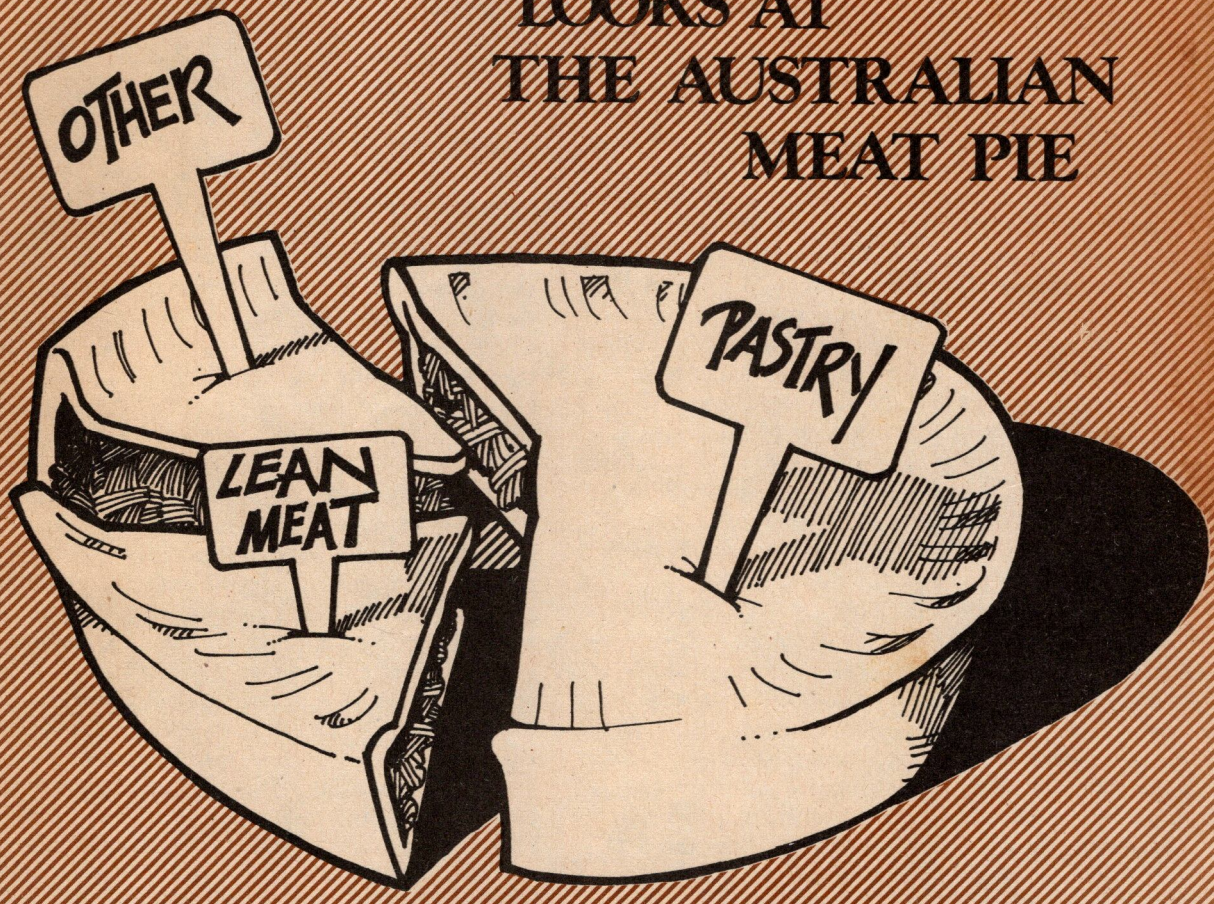
40 page issue

CHOICE

LOOKS AT THE AUSTRALIAN MEAT PIE



and at DISHWASHERS

VOL. 17 No 7 JULY 1976
THE JOURNAL OF THE AUSTRALIAN CONSUMERS' ASSOCIATION
Council Member of the International Organization of Consumers' Unions

ACA and SAA

PARTICIPATION AND THE CONSUMER

The Standards Association of Australia (SAA) is the recognized national organization for the promotion of industrial standardization in Australia. It is an independent, non-profit making body which receives support from both Australian and State Governments and from industrial and commercial interests.

Basically, an Australian Standard is a printed set of requirements, relating to a product or a code of practice, which is based on Australian conditions and practices. In its earlier years, national standardization in all countries concentrated on industrial and engineering areas and had little relevance to consumer goods, except with regard to safety requirements. In recent years, both nationally and internationally, attention has been given to the preparation of Standards specifically for goods purchased and used by consumers, including Standards relating to the performance of consumer products.

This is where the work of ACA comes in. Essentially, the work of SAA consists of bringing together representatives of industry, commerce, government, consumer bodies, professions and other interested parties to develop detailed standards. These people work on committees and their services are not paid for by SAA. Committees are the basic working groups which actually come together in a series of meetings around a table and hammer out the details of a new Australian Standard (or revise an old one), the use of which is almost entirely voluntary when it is completed.

At the moment, ACA believes that consumer organizations have no more than a token representation on SAA committees. Consumer groups have too little representation and (with the exception of representatives of Australian Federation of Consumer Organizations) those that do have must give their time voluntarily, whereas representatives of industry and commerce are paid by their employers for the time they devote to SAA committee meetings.

It is difficult for consumer groups to find representatives who are both technically competent in the relevant field and aware of important consumer considerations, as well as being willing and able to spare the necessary time to attend committee meetings.

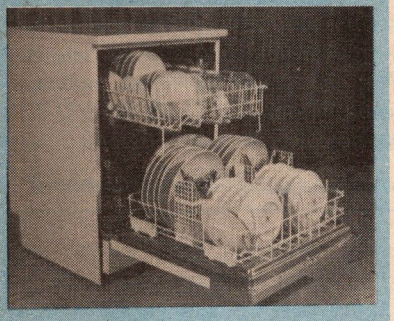
ACA also believes that more Standards should be compulsory. At the moment the adoption and use of Australian Standards is a voluntary process, except where safety of life or property is involved, when compliance with the Standard may be made compulsory by either State or Commonwealth legislation.

We also believe that with more vigorous consumer participation on SAA committees, Standards could be improved to a more adequate consumer level. For example, a recent committee was disbanded because the majority of members, representing manufacturers, did not feel there was any merit in having a Standard and the small number of consumer representatives were unable to enforce their point of view.

ACA would like to have greater participation on SAA committees, but this can only be achieved with the co-operation of our members who have the necessary technical knowledge and are aware of consumer requirements, and who are not involved in either industry, marketing or advertising. This assistance could take one of two forms. Interested members could either attend SAA committee meetings relevant to their area of expertise or they could make written comment about Standards which are in preparation, which we would incorporate with our own comments.

ACA hopes eventually to be able to afford to employ specialized staff whose main function would be to attend SAA meetings, but until this eventuates, we would be pleased to hear from any members interested in assisting us to give more adequate consumer representation on these committees.

CHOICE JULY 1976



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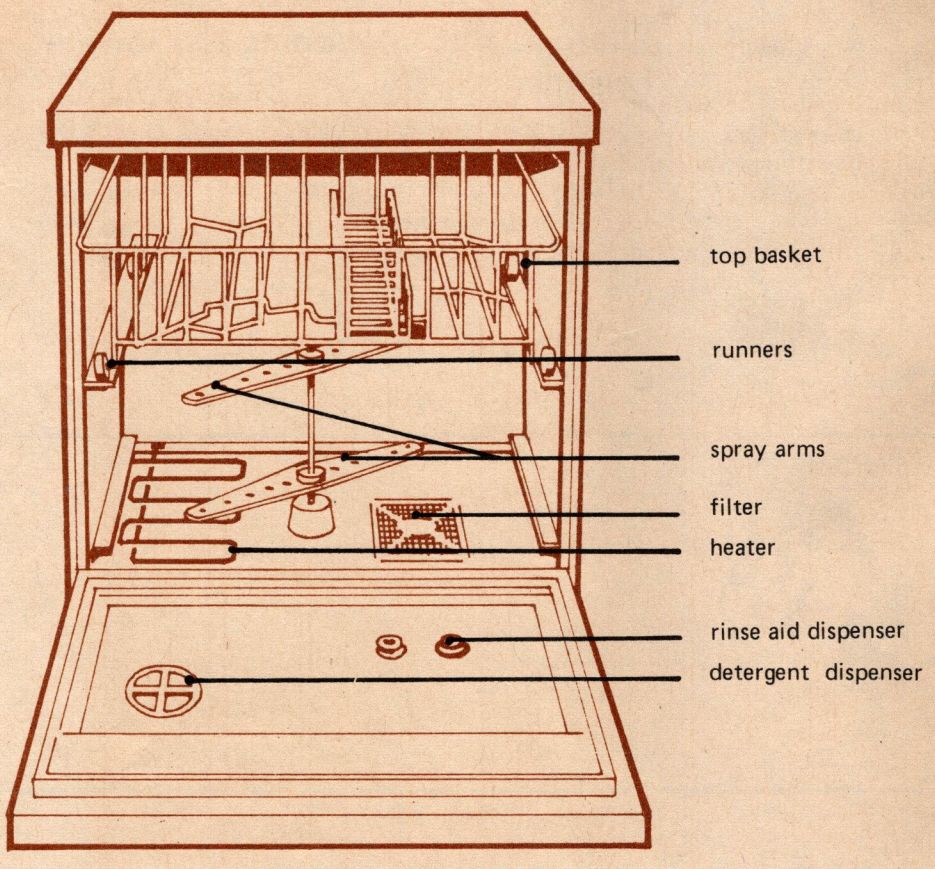
DISHWASHERS

More Australian families today are purchasing dishwashers to cut out the drudgery traditionally associated with washing up. Surprisingly, in these energy conscious times, a domestic dishwasher is not very wasteful of energy and can use less than washing up by hand. It is also more hygienic, due mainly to the higher washing temperature, the stronger detergents used, and the fact that drying is by heat alone (tea towels can harbour bacteria).

ACA has tested 12 domestic dishwashers, representing one model from every brand currently available in Australia (see our dishwasher survey in **CHOICE, May 1976). We recommend two models,** HOOVER D7006 and WESTINGHOUSE SF 160 T, which do a good cleaning job at a moderate cost.



Since our last dishwasher report (CHOICE, September 1973) Australian manufactured dishwashers have almost disappeared from the market, and our models were all imported. That dishwashers are becoming popular can be seen from the import numbers for domestic (and other) dishwashers—19 360 in 1972-1973 rising to 46 794 in 1974-1975. The industry expects to sell 80 000 units in 1976.

General quality and cleaning efficiency have improved and two new features have appeared—the 'Flo-Thru' drying on KITCHEN AID, and the spray force regulators on HOOVER, PHILIPS, SIMPSON and WESTINGHOUSE models. 'Flo-Thru' drying is achieved with an element outside the washing compartment which heats air that is then blown over the load by a fan. The spray force regulators are located on the spray arm hubs and are used to vary the force of the water spray according to the type of load and the heaviness of soiling.

What we bought

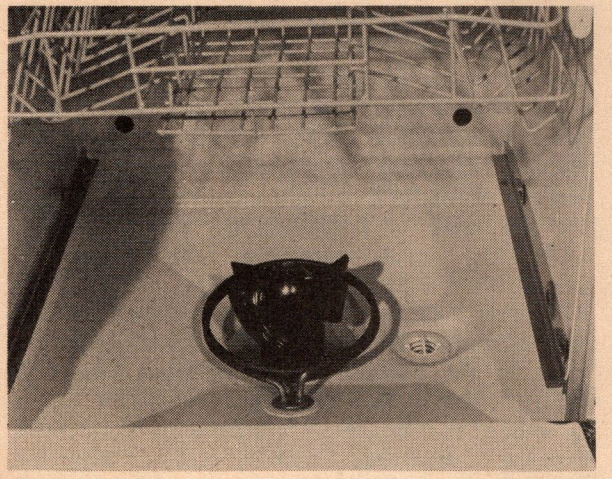
We bought large capacity, fully automatic, front loading, floor mounted dishwashers retailing at under $600. If there was a choice within brands, the model with the largest number of washing cycles was chosen. Generally these models were claimed to hold between 10 and 14 settings. We found all held 10 place settings except COLSTON (9), DISHLEX (11), DISHMASTER (6) and GENERAL ELECTRIC (8). NEW WORLD DM12 was the only model available in this brand and as it was a convertible model we bought a kit for $20.00 to convert it from a built-in to a free standing model.

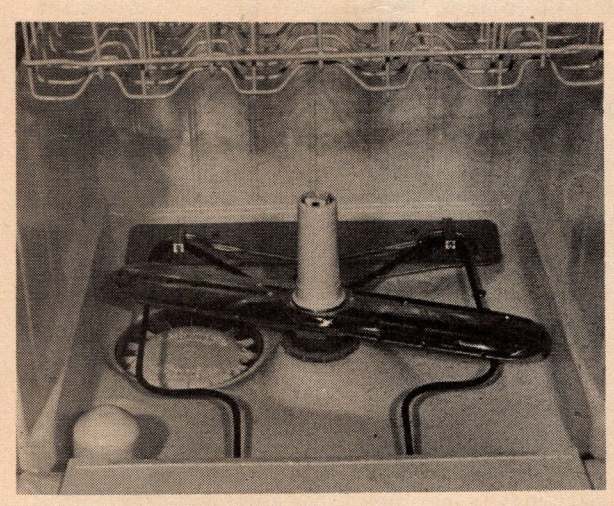
One brand which fitted our buying criteria but was not bought was KENWOOD. It was still awaiting approval from electricity authorities, and the distributor had no date for its release.

How they work

After scraping off any large pieces of food debris, the dirty utensils and cutlery are loaded into the plastic coated wire racks. All washing is done by sprays of water which are distributed over the load. The only difference between a wash and a rinse is the presence of detergent in the wash cycle. All models under test distributed the water over the load by means of rotating spray arms (see diagram), except DISHMASTER which used a plastic impeller at the bottom of the compartment to swirl the water up over the load (see photograph). The machines all have provision for releasing detergent and rinse aid at the appropriate parts of the cycle.

Drying is achieved in several different ways. Most of the machines tested had heater elements in the base of the compartment, a system which can bake on any food soiling remaining after the wash. Less elaborate, but quite effective, was the residual heat drying of COLSTON, PHILIPS and WESTINGHOUSE. In these brands drying was due to the residual heat left in the compartment after the final hot rinse, and was aided by opening the machine and leaving the dishes sitting in the racks for a short period before putting them away. KITCHEN AID's 'Flo-Thru' drying system has already been described.





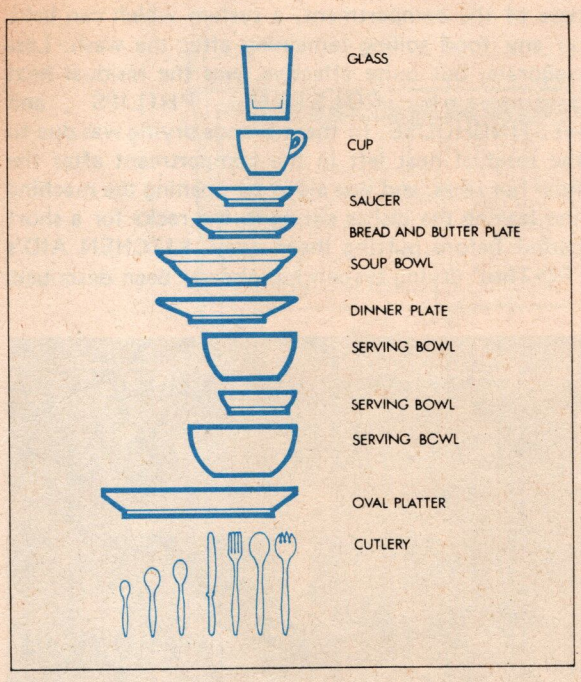
An impeller distributed water over the wash load in DISHMASTER 440 (left). All other machines tested used a rotating spray arm similar to that illustrated (right).

How much do they hold?

ACA used the place settings specified in the Draft Standard DR75046 Electric Dishwashers for Household Use (see box) to rate the capacity of each of the dishwashers. As many place settings as could be easily and comfortably fitted in the racks were loaded, followed by the three serving bowls and the platter. The number of place settings is shown in the Summaries. The largest capacity machine was DISHLEX (11 place settings) and the smallest was DISHMASTER (six place settings). Most took 10 place settings.

Clear photographs in some instruction books showed more place settings in the machines than we could fit in without risking incomplete washing, following the Draft Standard. (The rack designs had been modified since the instructions were printed.)

We found that all racks were easy to load after some reference to the instructions (this becomes less necessary as familiarization with the machine and the settings used increases). Initially, loading a large number of items can be quite difficult.



The standard place setting we used in our test.

Programs

The different programs on dishwashers simply give different numbers of washes and rinses. The normal program is a pre-rinse followed by the main wash at from 54°C to 94°C (depending on brand), one or more rinses and a drying period. If the water is heated in the dishwasher a normal program takes about one hour, although it varies from brand to brand.. Intensive or heavy duty programs for dirtier dishes or pots and pans are similar to the normal program but have an extra pre-wash and sometimes a water pressure adjustment to increase the force of the water hitting the wash load. Some machines also have a gentle cycle at reduced temperature and/or reduced pressure for delicate or lightly soiled items. There was a special plate warming program on some of the machines. We have listed the number of programs available on the dishwashers in the Summaries.

Dispensers

All of the dishwashers in this report had automatic detergent dispensers which released the detergent at the appropriate part of the cycle. For heavy duty cycles where there is a pre-wash, the detergent is put in a small trough on the door (see diagram). When the door is closed and the cycle starts the detergent is mixed with the water. As we warned in our article on **dishwasher detergents (CHOICE, May 1976) you** should never put dishwasher detergent directly onto the wash load—it is so strong that it can cause damage.

Similarly, all machines had a rinse aid dispenser, which released rinse aid during the final rinse. NEW WORLD, PHILIPS, SIMPSON and WESTINGHOUSE had adjustable rinse aid dispensers which could be altered to compensate for hard or soft water.

Racks and baskets

All the dishwashers had two racks which slid out, and into which the crockery was stacked. There were separate plastic baskets for cutlery. Some rack and basket designs were better than others. Several racks were adjustable and we found these convenient for stacking extra cups and glasses. Both racks could be easily removed for cleaning from all machines, except the top racks of DISHMASTER and GENERAL ELECTRIC which were not easy to remove. COLSTON, DISHLEX, GENERAL ELECTRIC, KITCHEN AID and NEW WORLD baskets allowed narrow-handled cutlery to fall down through the holes in the bottom. On all of these but NEW WORLD, such cutlery protruded through the basket far enough to obstruct the rotating spray arms. If this happens, incomplete washing occurs and the remaining soiling can be baked on in the drying part of the cycle. If the cutlery drops down as the

A cutlery basket that allowed narrow-handled cutlery to fall through, and one that didn't.

machine is being loaded it will obstruct the sliding action of the rack, which is annoying but can be rectified immediately. If it doesn't drop down until a later part of the cycle, there is no way you will know this until you open the machine at the end of the program and find the load still dirty. We think the manufacturers of the four dishwashers which suffer from this problem should improve their basket design so that cutlery cannot fall down and obstruct the spray arms or other parts of the mechanism.

Door safety switch

It is important to have a door switch or some other effective interlock device to automatically switch the machine off when the door is opened and/or to prevent the door from opening while the machine is in operation. Without such a device, anyone opening the door during a program could be splashed with hot water or strong detergent solution. All machines were provided with a satisfactory door switch, except DISHLEX, which had an effective interlock actuated by the On-Off switch.

Controls

The controls were mounted on the front door of all dishwashers, except COLSTON and INDESIT, on which they were located above the door on the front of the machine, just below the table top. All were rated good for convenience of use as long as the operating instructions were followed. On all except DISHMASTER and KITCHEN AID there was a

TWO ACA QUESTIONNAIRES

- **Servicing questionnaire**

In the centre of this issue you will find a four page servicing questionnaire. It covers four major domestic appliances—washing machines, refrigerators, dishwashers and stoves.

If you have bought one or more of these appliances since 1970, we would like to hear about your experiences, especially with regard to reliability and servicing. Please would you complete and return this questionnaire as soon as possible to the address below, marking your envelope 'Reliability and Servicing Questionnaire'.

- **School uniforms questionnaire**

Do you have children of school age who wear a school uniform? If you do, we would like you to help us by completing our detailed questionnaire on school uniforms. Please write to the address below, marking your envelope 'School Uniforms' and stating the number of questionnaires required (one for each school-age child).

Australian Consumers' Association,
28 Queen Street,
CHIPPENDALE, N.S.W. 2008

02-698 9200

This is ACA's new phone number, and has replaced all others. It has several automatic lines, and makes phoning us quicker and easier as callers will be switched through automatically to the first free line.

Brand and model	Measured program length (min)	Water used (l)	Running costs ($ per year)	Number of place settings	Wash performance Full load	Wash performance 2/3 load	Sauce-pans	Spotting	Drying
COLSTON 747	100	73	81	9	●	●●	●●●	●●●	●●
DISHLEX L14-10	60	57	70	11	●	●●●	●●●●	●●	●●●
DISHMASTER 440	40	39	64	6	●	●●	●●●●	●●	●●
GENERAL ELECTRIC SC720	120	75	68	8	●●●	●●●●	●●●●	●●●	●●
HOOVER D7006	110	89	62	10	●●●	●●●●	●●●●	●●●	●●●
INDESIT LS12SAU	117	70	74	10	●	●●●	●●●●	●●	●●●
KITCHEN AID KDC 27 EWHLS	81	71	65	10	●	●●	●●	●●●	●●●
MIELE G504D	66	74	43	10	●	●●●	●●●●	●●●	●●●
NEW WORLD DM12	47	55	51	10	●●●	●●●	●●	●●●	●●●
PHILIPS AAD003 AK 120P	79	61	50	10	●●	●●●	●●●	●●	●●
SIMPSON 52-007	83	61	69	10	●	●●	●●●	●●●	●●●
WESTINGHOUSE SF160T	80	58	49	10	●●	●●●	●●●●	●●	●●

(the more dots the better)

rotary program indicator which indicated which part of the cycle the machine had reached.

DISHMASTER had two switches, one labelled 'automatic' and the other 'manual'. The 'manual' switch actually controls the length of the wash cycle, which will continue for as long as the switch is on. COLSTON, DISHLEX, INDESIT, PHILIPS and WESTINGHOUSE incorporated program selection into the rotary program position indicator; on all other models program selection was also by separate push buttons or rocker switches.

Door opening was easier on some models than on others and ranged from easy one handed operation on HOOVER to more forceful operation on DISHMASTER. The opening handle on DISHLEX protrudes when the door is not fully locked and could easily catch on clothing if brushed past.

Wash chamber finish

Wash chambers were lined with stainless steel, with the exception of DISHMASTER (vitreous enamel and plastic coated steel), GENERAL ELECTRIC (plastic coated steel), KITCHEN AID (vitreous enamel), PHILIPS and WESTINGHOUSE (plastic). The vitreous enamel is more scratch and abrasion resistant than the relatively soft plastic coatings, but it can chip and expose the metal underneath to corrosion.

Installation

All models had table tops and were designed to fit in with a kitchen bench, although they could be placed at any convenient location within the kitchen if water and power supplies were close enough. (DISHMASTER had only a painted steel top which was easily scratched, all others were suitably protected.) All were designed to be fitted permanently in position except GENERAL ELECTRIC which was a mobile unit. It was mounted on castors and could be wheeled around the kitchen to any convenient location for loading or storage. DISHLEX, KITCHEN AID, MIELE, NEW WORLD, SIMPSON and WESTINGHOUSE all have similar mobile models.

All the dishwashers with feet had provision for levelling, except SIMPSON and DISHMASTER (which was designed to be secured by brackets).

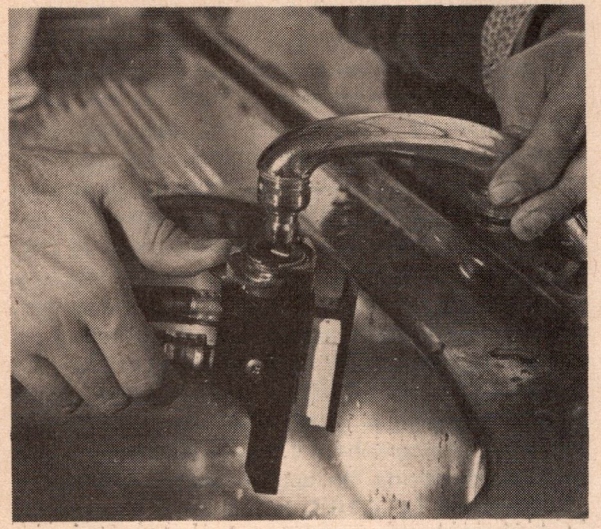
All dishwashers except MIELE could be operated from a standard 10 ampere power point. MIELE requires a 15 ampere supply and, as this is quite rare in average households, a separate circuit originating

from the switchboard would normally be necessary. MIELE was delivered without a plug. We do not think this is acceptable. A naive person might be tempted to fit a 10 ampere plug, which could blow a fuse when used and possibly damage house wiring.

All the dishwashers have provision for heating water internally. This ensures that it is heated to correct wash and rinse temperatures, even if the household hot supply is cooler than that required by the dishwasher. Some manufacturers recommend connection to a hot, and some to a cold, water supply. GENERAL ELECTRIC can be connected to a hot or cold water supply and we used cold for our tests. KITCHEN AID can be connected to hot and cold, or hot or cold, and we used both a hot and cold water supply for our tests of this machine.

All machines, except DISHMASTER and NEW WORLD, were supplied with flexible hoses for water supply and drainage, complete with fittings for attachment. DISHMASTER was not supplied with any supply hose and was suited only to permanent connection to supply. NEW WORLD was supplied with a length of copper tubing for permanent connection to a water supply. DISHMASTER and NEW WORLD were provided with flexible drain hoses.

Using the flexible hoses, none of the machines was difficult to install, but in most cases a plumber would be required for permanent connection to water supply and drainage. GENERAL ELECTRIC was the easiest to install with its snap on tap fitting (see photograph).



The snap on tap fitting of GENERAL ELECTRIC SC 720 helped make installation easy.

Water was admitted to all machines under supply pressure and, in all cases, drain water was removed by the dishwasher's pump action. The minimum supply pressure required for each machine is listed in the Summaries and it is important to make sure that the supply has at least this minimum pressure.

Instructions

All of the dishwashers were supplied with comprehensive instructions for installation, operation, loading and trouble finding, except GENERAL ELECTRIC (for which a set of instructions was supplied on request).

All instructions were well illustrated and were rated adequate. The only set which did not include a full description of each program on the machine was GENERAL ELECTRIC. The basic operation instructions of DISHMASTER were considered to be confusing. DISHMASTER has only two control switches, automatic and manual. To select any cycle other than the normal program ('automatic'), the 'manual' switch is operated for the length of time required for the wash. All other machines have pre-selected wash times.

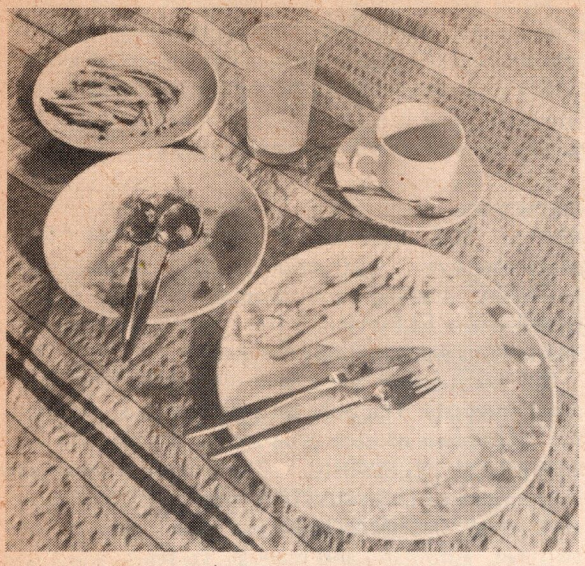
How well do they wash?

To test the washing efficiency of the dishwashers we loaded them with heavily soiled utensils which had been allowed to dry in the air for a day. This is a very severe test of a dishwasher's cleaning ability.

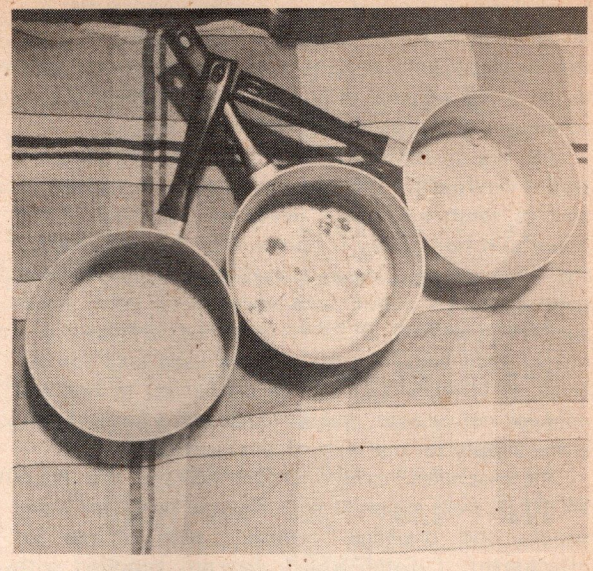
On each dishwasher we used the program recommended by the manufacturer for heavily soiled loads.

We used the water supply recommended by the manufacturer with cold water supply being used if a choice was given. Detergent and rinse aid as specified by the manufacturer were used.

Our first test was a full load with heavily soiled items. We soiled the glasses with milk; the cups and saucers with coffee, milk and sugar; the bread and butter plates with blackberry jam; half of each soup and dessert plate with boiled milk and rice with sugar and half with vegetable soup; the dinner plates, platters and serving bowls with lightly boiled egg, mashed potato and brown gravy in three strips on each plate, so as to cover the entire surface. The cutlery was soiled with similar substances as were applied to the related crockery. A fixed mass of each substance was applied each time and, after allowing all soiled items to stand in the atmosphere for 24 hours, they were loaded into the machine without being scraped off. The standing time ensured that the soiling strongly



A soiled place setting as used in the washing tests.



Three soiled aluminium saucepans used in the washing tests.

adhered to the utensil surfaces and represented the worst case likely to be met with in ordinary practice.

A rating of 'very good' was only made if the entire load was spotless after washing. Even the slightest speck of food remaining on any item in the load would prevent this rating.

The best performers on this test were GENERAL ELECTRIC, HOOVER, NEW WORLD, PHILIPS and WESTINGHOUSE, all rated good. Rice and soup were the most difficult soils to remove. SIMPSON baked small food particles onto the crockery and glasses, unlike any other machine, so we tried the test again—with the same result.

Next, we tried the same soiling, with only two thirds of the maximum number of place settings in the machines. Most gave an improved performance on this test. GENERAL ELECTRIC and HOOVER were rated very good, with every item spotlessly clean. WESTINGHOUSE, which left one grain of rice on a spoon, was rated good, and was one of the best performers. DISHMASTER improved considerably, but scattered rice, soup and gravy over the top rack load in small quantities. SIMPSON showed some improvement over the full load test but still baked minute food particles on to the top rack load. Again we repeated the test, and again got a similar result.

Drying

Most dishwashers were rated good for drying, with most leaving a few streaks on cutlery or glasses. Spotting was confined mostly to cutlery. Generally the better the drying performance the less the spotting. To allow for drying by residual heat the loads were left in all machines for about a quarter of an hour after the cycle finished before they were removed for inspection.

Saucepans

To test dishwasher performance on saucepans we used three 170 mm diameter, vertical sided aluminium saucepans, using special programs where available. Vegetable soup, mashed potato and milk rice with sugar (one substance per saucepan) were heated to the point where they adhered to the sides and bottom of the saucepan but were not burnt on. The saucepans were set aside to stand for two hours before washing. The results of this test were remarkably good with seven of the machines being rated very good (all substances removed). The poorest performer was NEW WORLD. Strong detergents and water jets do not clean aluminium as well as steel wool does and, although the pans are spotless, they do not come up bright and shiny in a dishwasher. Aluminium is more prone to corrosion in a dishwasher than it would be if washed by hand.

GENERAL ELECTRIC have described their SC720 dishwasher as 'Potscrubber', and used 'before' and 'after' photographs of a heavily soiled casserole in national advertising. We approached the distributors of GENERAL ELECTRIC for details of the casserole used, cooked several, and left them standing for periods of either four or 24 hours before washing.

The casserole dishes were washed as part of a two-thirds load and were sparkling clean upon removal from the machine in both cases. Although this is a severe test we consider that this model is no better than any of the other machines that were rated 'very good' on our saucepan cleaning test.

Cycle time

The time to complete a washing cycle as used for our dishwashing tests varied from 40 to 120 minutes (including any drying time before completion of the cycle). Generally there was no correlation between length of cycle and washing efficiency for dishes or saucepans. In addition to the cycles used in our tests all machines have shorter cycles for less heavily soiled loads (DISHMASTER must be operated manually in this case). HOOVER consistently ran for 45 minutes less than its stated cycle time but this did not seem to affect its washing efficiency.

Noise

We measured the noise generated by the machines in the noisiest part of the cycle (during a wash) and found little variation between the different brands. The noisiest was DISHMASTER. The dishwashers were as noisy as washing machines but not nearly so noisy as vacuum cleaners. Some members have found the noise to be sufficiently long lasting and irritating that they prefer not to be present when the machine is running. A common practice is to turn the machine on before going to bed.

Radio and television interference

We operated all the machines on the same circuit as a colour television set and a radio and found no interference on either.

Electrical safety

Dishwashers are prescribed items and must be type-approved by electricity authorities before sale. No prescribed article may be sold, hired, or exposed or advertised for sale or hire unless it has been approved by an electricity authority and is marked with an approval marking. There were no approval markings on DISHMASTER, KITCHEN AID or MIELE. These machines were in breach of the regulations and should be removed from the market. We tested all machines for electrical safety, and all passed satisfactorily.

Filters

All machines, except GENERAL ELECTRIC, were fitted with a filter to stop small scraps of food from blocking the pipes. Lack of a filter did not seem to affect the washing efficiency of the GENERAL ELECTRIC and our testers rated this a good feature as it simplified cleaning. Most of the other dishwashers had fine filters which were rated easy to remove and clean. DISHLEX had the hardest one to remove—both racks and both spray arms had to be removed, and then two thumbscrews, to release the filter. INDESIT required removal of a thumbscrew to release the filter, and the bottom spray arm on KITCHEN AID and MIELE had to be removed to get at theirs. It is best to clean the filter after every wash as an accumulation of food scraps can impede the flow of water. The SIMPSON filter requires care when being replaced. If the handle is not correctly lowered it can foul the lower spray arm and an incomplete wash can result.

Daily care

The only care required of a dishwasher other than cleaning the filter is an occasional wipe to remove any accumulated grease or grime from the wash chamber and the door seal, and occasional cleaning of the supply line filter (where fitted).

Reliability

As all of the dishwashers are imported we can use overseas experience to comment on their reliability.

WHICH?, the journal of the Consumers' Association in the UK, reports that, in the experience of their members, dishwashers tend to go wrong more often than other electrical appliances, and that two thirds of the dishwashers owned by those members developed faults in the first 30 months. The main problems were leaks (one in five), followed by failure to complete cycle, and blocked hoses or pumps.

Note, however, that such a record, which is of necessity historical, may not apply to a machine bought now. Improvements may have been made to machine design or new models introduced. ACA would be interested to hear from any members who have had problems with their dishwashers so that we can build up reliability records for the brands and models available in Australia (see centre insert).

During our own testing program, SIMPSON leaked unexpectedly on one occasion but we could find no fault, and the machine was returned to the start of the cycle, after which it performed correctly.

Our DISHMASTER developed a serious fault which prevented the fill valve from opening. A detached conductor was the cause and this prevented any water from entering the washing compartment at

the start of the cycle. We fixed the defect in our laboratory.

KITCHEN AID failed to progress beyond the pre-wash part of the cycle on only its second operation and, as the machine cannot be advanced manually with a rotary cycle indicator (unlike the other machines, except DISHMASTER), we called for service. A service mechanic arrived within a day of our call and rectified the defect. We have had no other trouble with the machine.

Hazards

DISHLEX, DISHMASTER, GENERAL ELECTRIC, HOOVER, INDESIT, MIELE, NEW WORLD and SIMPSON all had heater element bars in the bottom of the washing compartment which can be hot at the end of a cycle. If unloading any of these machines shortly after the cycle finishes, care should be taken not to touch these bars. In any event, the contents of the dishwasher will be very hot for some minutes after the cycle stops. We consider it good practice to leave all machines with the door open for about a quarter of an hour after the cycle finishes to facilitate drying.

A dishwasher uses strong detergent and high temperatures, and can cause damage to certain delicate utensils. Wherever the pattern on crockery is under the glaze or in the glaze, dishes should be fairly safe, but if the pattern is on the glaze or is hand painted, like some bone china, you need to be much more careful. Glassware may eventually be affected by the dishwasher detergents and take on a milky appearance. To avoid this, use a lower temperature cycle and don't overdo the detergent. Coloured decorations on glassware will, with certainty, wear off more quickly in a dishwasher.

Dishwasher detergent causes little damage to most cutlery, but it is probably best not to put cutlery with bone, wood or plastic handles into a dishwasher unless the cutlery manufacturer indicates that it will be safe to do so. Not only may the material itself be damaged, but the glue securing the handle can melt. Stainless steel cutlery should be washed as soon as possible after use. The longer it remains wet with water, acidic or salty food, the quicker it will show signs of corrosion. Nylon utensils can be washed in a dishwasher, although after a while they may start to look scruffy. Softer plastics, such as those used for food containers usually aren't suitable, as they are affected by the high temperatures.

Powerful water jets in dishwashers may dislodge light items and throw them around inside the machine, sometimes causing breakage. (There are cases of fires having been started by items falling across the heater element.) Care in loading, so that fragile items cannot be easily displaced, is the solution. Alternatively, wash such delicate items by hand or use the gentle cycle or spray force regulator (if the machine has it).

Running costs

In the Table we have shown the cost per year of detergent, rinse aid and electricity used by each machine during the cycle we used for our washing tests, if used once daily. Where hot supply water was used we have included the cost of heating it in the household hot water service. This is the actual running cost after the machine has been bought and installed, and does not include depreciation or cost of repairs. Allowing for a useful life of seven years and an interest rate of 10 per cent, depreciation will amount to something like $28 a year for each $100 of the dishwashers cost. You can see that this is a substantial sum when compared to the purchase price and running costs, and should not be overlooked.

MIELE was the cheapest machine to run and COLSTON the most expensive. Taking into account initial cost and the number of place settings which can be washed at one time, however, WESTINGHOUSE was the most economical and DISHMASTER the least economical. The largest component of the running cost was the detergent cost, and MIELE used the least. The running cost is independent of the size of the load and to get maximum economy it is necessary to fully load the machine.

In our tests and calculations we used the detergent and rinse aid recommended by the manufacturer or, if none was recommended, the cheapest satisfactory one available. As we reported recently (CHOICE, April 1976) there is very little difference between brands of detergent and rinse aid.

Guarantees

All the dishwashers had a 12 months parts and labour guarantee. The distributors of NEW WORLD informed us that their guarantee had been extended to 24 months, although the guarantee card which accompanied our test machine stated 12 months.

In addition to the 12 months, DISHLEX offered a 10 year guarantee on the stainless steel interior, DISHMASTER offered free service and adjustments for the first three months, and KITCHEN AID offered a five year guarantee on the motor.

No guarantee included the cost of transportation for a machine requiring special attention, and, outside the normal area of the local service depot, the travel costs of the serviceman also have to be borne by the owner.

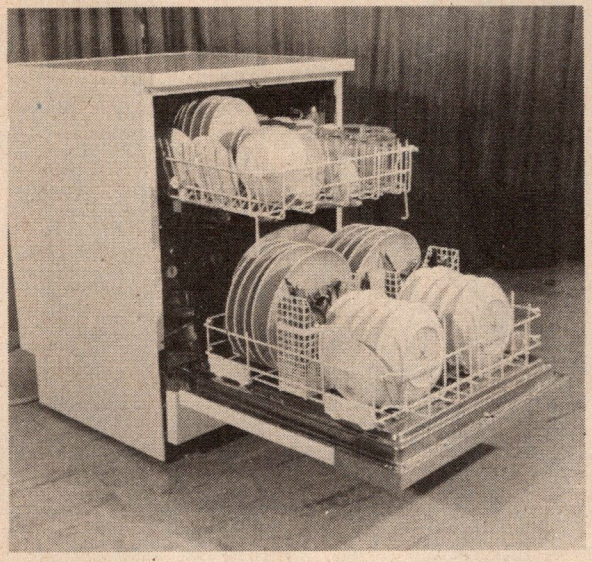
Service costs outside guarantee period

We tried to ascertain typical costs for a service call outside the guarantee period. No service contracts were available on any of the machines. Charges per call varied from $11.00 to $18.00, with a labour charge based on multiples of an additional short time. What it amounts to is that it will cost around $20.00 per hour for a service call, with the cost of parts extra. Details of service call costs are shown in the Summaries.

Conclusions

To be of any use, a dishwasher must wash dishes effectively. It should involve less effort than washing by hand, not cost too much to run, and be reliable.

Dishwashing efficiency varied quite widely on our tests. HOOVER was the best performer, with GENERAL ELECTRIC a close runner up. Other good performers were NEW WORLD, PHILIPS and WESTINGHOUSE. KITCHENMAID and SIMPSON stood out as being poorer performers than any of the others.



The recommended HOOVER D7006 fully loaded.

The number of programs available on a machine increases its usefulness. We consider four to be a reasonable number—plate warmer cycle, gentle wash cycle, normal wash cycle and a cycle for pots and pans. The 10 programs on DISHLEX and 13 on HOOVER are excessive, and most are likely to be used only rarely. The two programs on DISHMASTER and KITCHEN AID, on the other hand, are inadequate and neither machine did very well in our washing tests.

A dishwasher with a large capacity means less frequent washes, with savings in time and money. We could fit 11 place settings into the DISHLEX and 10 into most of the others. COLSTON held nine, GENERAL ELECTRIC eight and DISHMASTER, with the smallest capacity, six—yet each machine occupies much the same space in the kitchen.

COLSTON, DISHLEX, GENERAL ELECTRIC and KITCHEN AID had cutlery baskets which allowed narrow-handled cutlery to fall down and obstruct the motion of the lower rack and the rotation of the spray arms—very inconvenient, and poor design.

On a day to day basis, MIELE was the cheapest to run and COLSTON the most expensive. However, MIELE is one of the most expensive to purchase and COLSTON is one of the cheapest. Also, overall costs have to be balanced against the effect of depreciation, which increases with increasing purchase price.

We think the best value is represented by a moderately priced machine which does a good job of washing all types of crockery, cutlery, pots and pans, with a large capacity and no fiddly little problems like hard to get at filters or obstructed spray arms. Our recommendation is HOOVER. Slightly cheaper but not as good a washer, WESTINGHOUSE is cheap to run and is a good buy at the price.

Recommendations

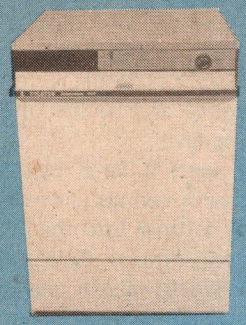
HOOVER D 7006	$369
WESTINGHOUSE SF 160 T	$309

Pre-publication check

The price of HOOVER D7006 has risen to $375 and WESTINGHOUSE SF 160T to $319. (We also found that two models of MIELE are available in all States except New South Wales.)

COLSTON 747 $339

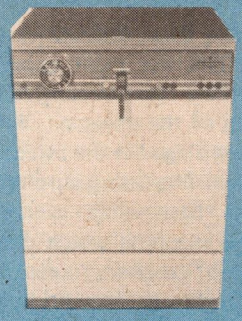
Manufacturer/Distributor: Pye Industries Sales Pty Ltd



Country of origin: Italy
Dimensions closed (cm): 85(h)x60(w)x65(d)
Guarantee: 12 months labour and parts
Capacity: 9 place settings plus 5 glasses
Number of programs: 4
Features: Steam sterilisation at end of cycle
Water supply: Cold
Water pressure (kPa): minimum 34/maximum 1033
Service cost: $18 first 45 minutes, $1.50 each additional 15 minutes.
Comments: Filter easy to remove and clean. Cutlery can obstruct operation of machine. Steam issues from machine at end of cycle—care needed. Forgotten articles can be added during cycle.

DISHLEX L14-10 $399

Manufacturer/Distributor: Dishlex Pty Ltd



Country of origin: Italy
Dimensions closed (cm): 86(h)x60(w)x63(d)
Guarantee: 12 months labour and parts, 10 years stainless steel interior
Capacity: 11 place settings plus 1 cup and 3 glasses
Number of programs: 10
Features: Door interlocked—cannot be opened unless machine is off
Water supply: Hot or cold
Water pressure (kPa): minimum 20/maximum 792
Service cost: $11 first 15 minutes, $3 each additional 15 minutes
Comments: Cutlery can obstruct operation of machine. Forgotten items can be added during cycle

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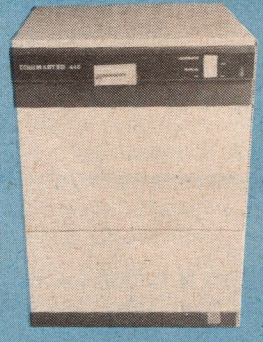
DISHMASTER 440 $255

Manufacturer/Distributor: Dishmaster Appliances Ltd



Country of origin: New Zealand
Dimensions closed (cm): 88(h)x6(w)x64(d)
Guarantee: 12 months labour and parts, three months free service
Capacity: 6 place settings plus 3 cups, 6 saucers and 2 small plates
Number of programs: 2
Features: None
Water supply: Hot
Water pressure (kPa): minimum 18/maximum 826
Service cost: $14.50 first 20 minutes, $1.50 each additional 10 minutes
Comments: Filter easy to remove and clean. Door lock awkward. Plumber necessary for installation. No indication of cycle progress. Top rack not easily removed. Forgotten items can be added during cycle.

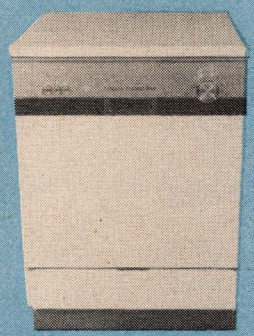
GENERAL ELECTRIC SC720 $399

Manufacturer/Distributor: General Electric-Kirby Appliances Ltd

Country of origin: USA
Dimensions closed (cm): 90(h)x63(w)x65(d)
Guarantee: 12 months labour and parts
Capacity: 8 place settings plus 6 cups or glasses and 1 dinner plate
Number of programs: 4
Features: No internal filter, snap-action tap coupling
Water supply: Hot or cold
Water pressure (kPa): minimum 103/maximum 826
Service cost: $13.50 first 10 minutes, $2.50 each additional 10 minutes
Comments: Instruction book only supplied to us on request. Top rack not easily removed. Cutlery can obstruct operation of machine. Forgotten items can be added during cycle.

HOOVER D7006 $369

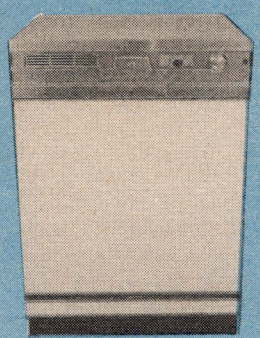
Manufacturer/Distributor: Hoover Australia Pty Ltd



Country of origin: France
Dimensions closed (cm): 85(h)x60(w)x62(d)
Guarantee: 12 months labour and parts
Capacity: 10 place settings plus one dessert plate, one dinner plate and one cup
Number of programs: 13
Features: Adjustable top rack (two positions) and adjustable spray pressure on lower arm.
Water supply: Cold
Water pressure (kPa): minimum 96/maximum 960
Service cost: No recommended fixed rate
Comments: Filter easy to remove and clean. Forgotten items can be added during cycle. Generally high performance. Recommended.

INDESIT LS12S AU $335

Manufacturer/Distributor: Norge Appliances

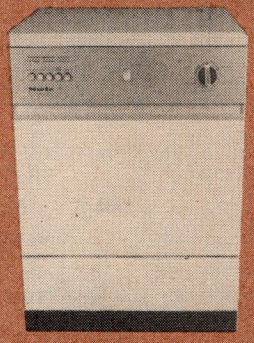


Country of origin: Italy
Dimensions closed (cm): 85(h)x60(w)x63(d)
Guarantee: 12 months labour and parts
Capacity: 10 place settings plus 4 glasses and 2 cups
Number of programs: 6
Features: None
Water supply: Hot or cold
Water pressure (kPa): minimum 20/maximum 1000
Service cost: $14 first 12 minutes, $1.50 each additional 6 minutes
Comments: Filter easy to remove and clean. Forgotten items can be added during cycle

KITCHEN AID KDC 27 EWHLS $585
Manufacturer/Distributor: Keating & Murphy Sales Pty Ltd

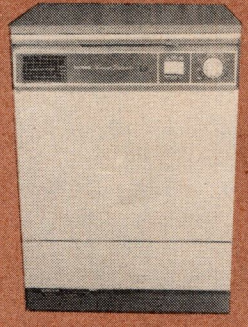
Country of origin: West Germany
Dimensions closed (cm): 85(h)x60(w)x67(d)
Guarantee: 12 months labour and parts, 5 years motor
Capacity: 10 place settings plus 4 small plates
Number of programs: 2
Features: Flow-through drying
Water supply: Hot and cold, or hot or cold
Water pressure (kPa): Not stated
Service cost: $10.50 first 15 minutes, $3 each additional 15 minutes
Comments: Cutlery can obstruct operation of machine. No indication of cycle progress. Forgotten items can be added during cycle.

MIELE G504D $510
Manufacturer/Distributor: Dishwashing Machine Centre



Country of origin: West Germany
Dimensions closed (cm): 86(h)x60(w)x62(d)
Guarantee: 12 months labour and parts
Capacity: 10 place settings plus 2 cups and 4 glasses
Number of programs: 4
Features: Adjustable top rack (3 positions)
Water supply: Cold
Water pressure (kPa): minimum 147/maximum 981
Service cost: $11 first 15 minutes, $3 each additional 15 minutes
Comments: Requires 15 ampere power supply. Forgotten items can be added during cycle.

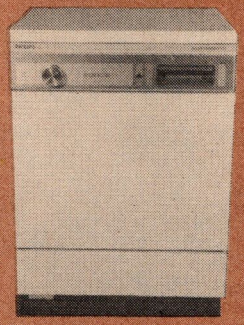
NEW WORLD DM12 $445 (plus $20 for conversion to free standing model)
Manufacturer/Distributor: New World Appliances Pty Ltd



Country of origin: Sweden
Dimensions closed (cm): 84(h)x60(w)x66(d)
Guarantee: 24 months labour and parts
Capacity: 10 place settings (with 4 cups double stacked)
Number of programs: 6
Features: Adjustable rinse aid dispenser for hard and soft water
Water supply: Hot
Water pressure (kPa): minimum 151/maximum 1213
Service cost: $12.50 first 12 minutes, $2 each additional 12 minutes
Comments: Filter easy to remove and clean. Forgotten items can be added during cycle.

PHILIPS AAD003 / AK 120P $319

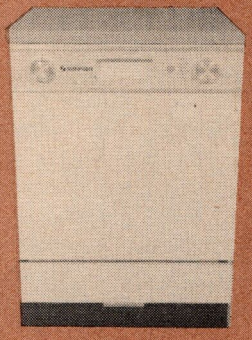
Manufacturer/Distributor: Philips Major Domestic Appliances



Country of origin: West Germany
Dimensions closed (cm): 85(h)x60(w)x64(d)
Guarantee: 12 months labour and parts
Capacity: 10 place settings plus 2 cups
Number of programs: 4
Features: Spray force regulator. Adjustable rinse aid dispenser for hard and soft water
Water supply: Cold
Water pressure (kPa): minimum 100/maximum 800
Service cost: $17.80 first 20 minutes, maximum of $25.05 per hour
Comments: Filter easy to remove and clean. Not recommended to interrupt cycle, but can be done to add forgotten item.

SIMPSON 52-007 $355

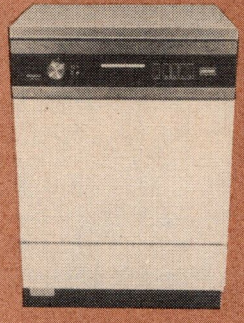
Manufacturer/Distributor: Simpson Pope Ltd



Country of origin: West Germany
Dimensions closed (cm): 85(h)x60(w)x63(d)
Guarantee: 12 months labour and parts
Capacity: 10 place settings plus 2 cups, 2 saucers and 1 glass
Number of programs: 5
Features: Spray force regulator. Adjustable rinse aid dispenser for hard and soft water
Water supply: Hot or cold
Water pressure (kPa): minimum 17/maximum 785
Service cost: $13 first 15 minutes, $1.15 each additional 5 minutes
Comments: Filter easy to remove and clean. Not recommended to interrupt cycle to add forgotten item.

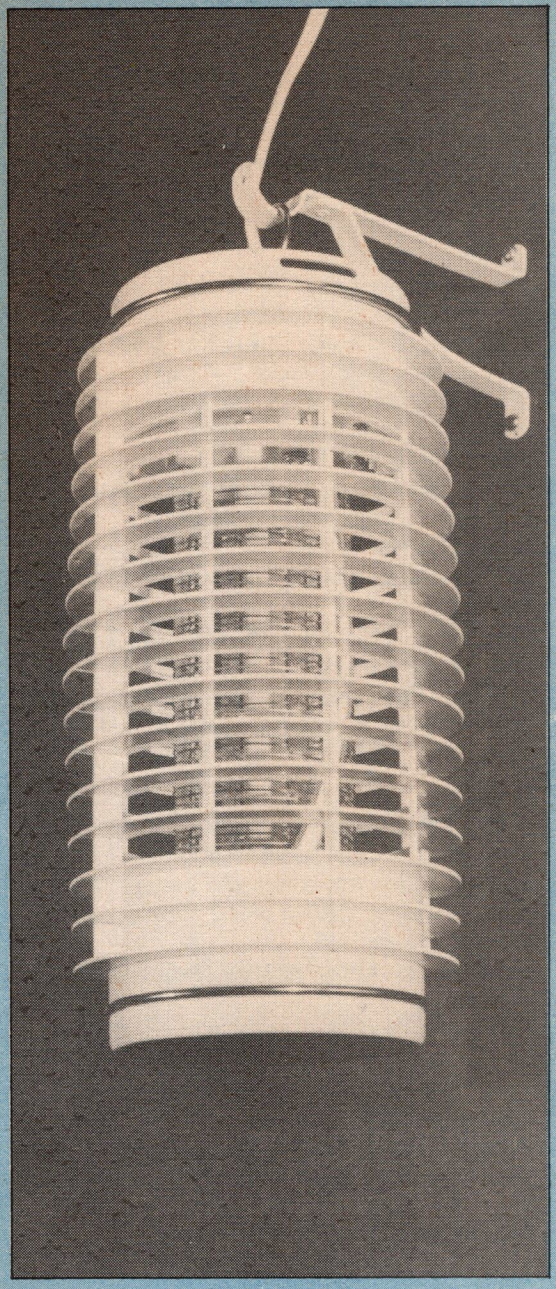
WESTINGHOUSE SF160T $309

Manufacturer/Distributor: Email Ltd



Country of origin: West Germany
Dimensions closed (cm): 85(h)x60(w)x63(d)
Guarantee: 12 months labour and parts
Capacity: 10 place settings plus 2 cups
Number of programs: 5
Features: Spray force regulator. Adjustable rinse aid dispenser
Water supply: Cold
Water pressure (kPa): minimum 34/maximum 1378.
Service cost: $15 first 24 minutes, $10 each additional hour
Comments: Filter easy to remove and clean. Forgotten items can be added during cycle. Good wash performance, reasonable in price and economical to operate. Recommended.

Sentinel Insect Killer



In CHOICE, February 1976 we looked at a number of insect control devices. SENTINEL is a widely advertised electric insect exterminator which is similar to, but considerably cheaper than, the three electrified types reported on then. It is designed to be hung out of reach, and kills insects coming into contact with its high voltage grid. A blue fluorescent tube is mounted behind the grid.

ACA purchased this unit for $39.50 and tested it for effectiveness in killing insects and electrical safety.

The voltage on the grid wire is just over 1000 volts DC. We found that the unit did kill flies and small moths but was not effective in killing larger moths. As with the similar devices tested earlier, it tended to attract the insects you do not need to kill, that is moths, and did not attract the insects you would like to eliminate, namely flies and mosquitoes.

SENTINEL did not pass the electrical safety test satisfactorily, failing on two counts. Australian Standards C100 and C150 requires that a standard test finger should not be able to make contact with the high voltage grid and, although this was satisfied on SENTINEL, ACA's slender test finger, which is used to represent the fingers of children and some women, could easily make this contact. For this reason we consider SENTINEL to be unsafe for use within the home. The manufacturer makes a point in the instructions that SENTINEL is to be hung out of reach, but this may not always be possible in the home, as it is not a fixed installation. Simple redesign would make this unit safe.

SENTINEL is also claimed to be double insulated. We found two live terminals within easy reach of our slender test finger and these are not double insulated within the meaning of the Standard. They are connected to the mains supply and could be quite dangerous.

Because of its failure to satisfy electrical safety requirements, ACA does not recommend that members purchase SENTINEL, particularly as this type of device is not very effective in attracting and killing flies and mosquitoes.

A.C.A. MEMBERS QUESTIONNAIRE ON RELIABILITY AND SERVICING

Consumers face many problems after the purchase of major appliances such as stoves, refrigerators, washing machines and dishwashers. Some of these are problems associated with the reliability and servicing of the appliances.

We would like to know about your experiences in this respect.

This questionnaire covers washing machines, refrigerators, dishwashers and stoves, which you have purchased since 1970.

Please answer as many questions as possible for each appliance. If you are unable to recall or don't know the answer, just skip that question and go on to the next.

Use a ball-point pen if possible, and when you remove this questionnaire please be careful not to tear the pages.

If you have any further comments on the reliability and servicing of these appliances, would you please write them down separately and attach the piece of paper to the questionnaire.

Please answer the questionnaire as soon as possible and return the completed questionnaire and any other comments marked "Reliability and Servicing Questionnaire", Australian Consumers' Association, 28 Queen Street, Chippendale, 2008, by 15th September, 1976.

(1) (2)(3)(4)(5)(6)

1. WASHING MACHINES

1.1 (7) Is the washing machine . . . (circle number)

Automatic – large?	1
Automatic – small?	2
Twin tub?	3
Other (specify);	

1.2 (8) (9) What brand of washing machine have you had since 1970? (please specify)

1.3 (10) When did you obtain the machine? (specify year)

1.4 (11) Where was the machine bought? (name store)

1.5 (12) How much did the washing machine cost?

1.6 (13) Was the machine purchased at a discount price? (circle number)

Yes	1
No	2
Don't know	3

1.7 (14) If yes, was the discount . . . (circle number)

asked for by you?	1
offered by the salesman?	2
already a 'discount' price?	3
don't know	4

1.8 (15) Was there a guarantee given with the machine? (circle number)

Yes – written	1
Yes – oral	2
No	3
Don't know	4

1.9 (16) How long was the guarantee period, and what did the guarantee cover? (specify)

1.10 (17) During the guarantee period, how many service calls for faults did you have, or have you had?

1.11 (18) Did the guarantee card say where servicing could be obtained? (circle number)

No guarantee	1
Yes	2
No	3
Don't know	4

1.12 (19) If no, how did you find out where to have your machine serviced? (specify)

1.13 (20) After the guarantee expired, how many service calls have you had for your washing machine?

1.14 (21) Have you had any problems with your washing machine? . . . (circle number/s)

No	1
Yes – motor failure	1
– pump	2
– drum	3
– agitators	4
– control, timing mechanisms, switch	6
– thermostat	7
– leakages	8
– faulty or damaged finishes including rust	9
– other (specify)-	10

1.15 (22) Who serviced your washing machine? (circle number)

No need for service	1
Manufacturer	2
Retailer	3
Local repairer	4
Self/husband/wife	5
Don't know	6

1.16 (23) Were you caused delay between ringing for service and the serviceman arriving? (circle number)

No delay	1
Yes – 1 day	2
– 2-4 days	3
– 5-7 days	4
– 8-14 days	5
– 15 days or more	6
Don't know	7

1.17 (24) Was there any further delay until the machine was fixed entirely? (specify time)

1.18 (25) If the washing machine was not under guarantee, or if the guarantee did not cover the repairs, how much did the repairs cost?

1.19 (26) Were you satisfied with the service given? (circle number)

Yes	1
No – difficult to contact repair people	2
– repairman took too long to arrive	3
– delay too long in getting parts	4
– too long for other reasons	5
– faults not corrected satisfactorily	6
– too expensive	7
– repairman unpleasant/ unhelpful	8
– repairman did not keep appointment	9
– other reasons (specify)	10

1.20 (27) Was there a service contract for service after expiry of the guarantee? (circle number)

Yes	1
No	2
Don't know	3

1.21 (28) If yes, how was the contract offered to you? (By manufacturer, or retailer, or door-to-door salesman or whoever, please specify.)

1.22 What was the cost of the service
(29) contract? (please specify)

1.23 Would you buy this brand of
(30) washing machine again? (circle number)

Yes	1
No	2
Don't know	3

(2) (1)(2)(3)(4)(5)

2. REFRIGERATORS

2.1 What brand of refrigerator have you
(6) had since 1970? (please specify)
(7)

2.2 What is the size of the refrigerator?
(8) (specify)

2.3 When did you obtain the machine?
(9) (specify year)

2.4 Where was the refrigerator bought?
(10) (Name store)

2.5 How much did the refrigerator
(11) cost?

2.6 Was the refrigerator purchased at a
(12) discount price? (circle number)

Yes	1
No	2
Don't know	3

2.7 If yes, was the discount (circle
(13) number)

asked for by you?	1
offered by the salesman?	2
already a 'discount' price?	3
Don't know	4

2.8 Was there a guarantee given with
(14) the machine? (circle number)

Yes – written	1
Yes – oral	2
No	3
Don't know	4

2.9 How long was the guarantee period,
(15) and what did the guarantee cover? (specify)

2.10 During the guarantee period, how
(16) many service calls for faults did you have, or have you had?

2.11 Did the guarantee card say where
(17) servicing could be obtained? (circle number)

No guarantee	1
Yes	2
No	3
Don't know	4

2.12 If no, how did you find out where
(18) to have your refrigerator serviced? (specify)

2.13 After the guarantee expired, how
(19) many service calls have you had for your refrigerator?

2.14 Have you had any problems with
(20) your refrigerator? (circle number/s)

No	1
Yes – thermostat (including general compartment and freezer compartment)	2
– motor failure and seal system	3
– body work – rust	4
– excessive noises or vibration	5
– door seal	6
– other (specify)	7

2.15 Who serviced your refrigerator?
(21) (circle number)

No need for service	1
Manufacturer	2
Retailer	3
Local repairer	4
Self/husband/wife	5
Don't know	6

2.16 Were you caused delay between
(22) ringing for service and the serviceman arriving? (circle number)

No delay	1
Yes – 1 day	2
– 2-4 days	3
– 5-7 days	4
– 8-14 days	5
– 15 days or more	6
Don't know	7

2.17 Was there any further delay until
(23) the refrigerator was fixed entirely? (specify time)

2.18 If the refrigerator was not under
(24) guarantee, or if the guarantee did not cover the repairs, how much did the repairs cost?

2.19 Were you satisfied with the service
(25) given? (circle number)

Yes	1
No – difficult to contact repair people	2
– repair took too long to arrive	3
– delay too long in getting parts	4
– too long for other reasons	5
– faults not corrected satisfactorily	6
– too expensive	7
– repairman unpleasant/ unhelpful	8
– repairman did not keep appointment	9
– other reasons (specify)	10

2.20 Was there a service contract for
(26) service after expiry of the guarantee? (circle number).

Yes	1
No	2
Don't know	3

2.21 If yes, how was the contract
(27) offered to you? (By manufacturer, or retailer, or door-to-door salesman or whoever, please specify.)

2.22 What was the cost of the service
(28) contract? (please specify)

2.23 Would you buy this brand of
(29) refrigerator again? (circle number)

Yes	1
No	2
Don't know	3

(3) (1)(2)(3)(4)(5)

3. DISHWASHERS

3.1 (6) (7) What brand of dishwashing machine have you had since 1970? (please specify)

3.2 (8) When did you obtain the dishwasher? (specify year)

3.3 (9) Where was the dishwasher bought? (name store)

3.4 (10) How much did the dishwasher cost?

3.5 (11) Was the dishwasher purchased at a discount price? (circle number)

Yes	1
No	2
Don't know	3

3.6 (12) If yes, was the discount (circle number)

asked for by you?	1
offered by the salesman?	2
already a 'discount' price?	3
Don't know	4

3.7 (13) Was there a guarantee given with the machine? (circle number)

Yes – written	1
Yes – oral	2
No	3
Don't know	4

3.8 (14) How long was the guarantee period, and what did the guarantee cover? (specify)

3.9 (15) During the guarantee period, how many service calls for faults did you have, or have you had?

3.10 (16) Did the guarantee card say where servicing could be obtained? (circle number)

No guarantee	1
Yes	2
No	3
Don't know	4

3.11 (17) If no, how did you find out where to have your dishwasher serviced? (specify)

3.12 (18) After the guarantee expired, how many service calls have you had for your dishwasher?

3.13 (19) Have you had any problems with your dishwasher? (circle number/s)

No	1
Yes – water pump failure	2
– thermostat failure	3
– corrosion on inside lining including rust	4
– faulty seals	5
– faulty fittings (baskets etc)	6
– faulty finishes	7
– excessive noise or vibration	8
– other (specify)	9
Don't know	10

3.14 (20) Who serviced your dishwasher? (circle number)

No need for service	1
Manufacturer	2
Retailer	3
Local repairer	4
Self/husband/wife	5
Don't know	6

3.15 (21) Were you caused delay between ringing for service and the serviceman arriving? (circle number)

No delay	1
Yes – 1 day	2
– 2-4 days	2
– 5-7 days	3
– 8-14 days	4
– 15 days or more	6
Don't know	7

3.16 (22) Was there any further delay until the dishwasher was fixed entirely? (specify time)

3.17 (23) If the dishwasher was not under guarantee, or if the guarantee did not cover the repairs, how much did the repairs cost?

3.18 (24) Were you satisfied with the service given? (circle number)

Yes	1
No – difficult to contact repair people	2
– repairman took too long to arrive	3
– delay too long in getting parts	4
– too long for other reasons	5
– faults not corrected satisfactorily	6
– too expensive	7
– repairman unpleasant/ unhelpful	8
– repairman did not keep appointment	9
– other reasons (specify)	10

3.19 (25) Was there a service contract for service after expiry of the guarantee? (circle number)

Yes	1
No	2
Don't know	3

3.20 (26) If yes, how was the contract offered to you? (By manufacturer, or retailer, or door-to-door salesman or whoever, please specify.)

3.21 (27) What was the cost of the service contract? (please specify)

3.22 (28) Would you buy this brand of dishwashing machine again? (circle number)

Yes	1
No	2
Don't know	3

(4) (1)(2)(3)(4)(5)

4. STOVES

4.1 (6) Is the stove . . . (circle number)

Gas – upright?	1
– bench top?	2
– wall oven?	3
Electric – upright?	4
– bench top?	5
– wall oven?	6

4.2 (7) (8) What brand of stove have you had since 1970? (please specify)

4.3 (9) When did you obtain the stove? (specify year)

4.4 (10) Where was the stove bought? (name store)

4.5 (11) How much did the stove cost?

4.6 (12) Was the stove purchased at a discount price? (circle number)

Yes	1
No	2
Don't know	3

4.7 (13) If yes, was the discount . . . (circle number)

asked for by you?	1
offered by the salesman?	2
already a 'discount' price	3
Don't know	4

4.8 (14) Was there a guarantee given with the stove? (circle number)

Yes – written	1
Yes – oral	2
No	3
Don't know	4

4.9 (15) How long was the guarantee period, and what did the guarantee cover? (specify)

4.10 (16) During the guarantee period, how many service calls for faults did you have, or have you had?

4.11 (17) Did the guarantee card say where servicing could be obtained? (circle number)

No guarantee	1
Yes	2
No	3
Don't know	4

4.12 (18) If no, how did you find out where to have your machine serviced? (specify)

4.13 (19) After the guarantee expired, how many service calls have you had for your stove?

4.14 (20) Have you had any problems with your stove? (circle number/s)

No	1
Yes – failure of elements	2
– thermostat	3
– electrical faults	4
– oven doors (including glass	5
– finishes	6
– other (specify)	7
Don't know	8

4.15 (21) Who serviced your stove? (circle number)

No need for service	1
Manufacturer	2
Retailer	3
Local repairer	4
Self/husband/wife	5
Don't know	6

4.16 (22) Were you caused delay between ringing for service and the serviceman arriving? (circle number)

No delay	1
Yes – 1 day	2
– 2-4 days	3
– 5-7 days	4
– 8-14 days	5
– 15 days or more	6
Don't know	7

4.17 (23) Was there any further delay until the stove was fixed entirely? (specify time)

4,18 (24) If the stove was not under guarantee, or if the guarantee did not cover the repairs, how much did the repairs cost?

4.19 (25) Were you satisfied with the service given? (circle number)

Yes	1
No – difficult to contact repair people	2
– repairman took too long to arrive	3
– delay too long in getting parts	4
– too long for other reasons	5
– faults not corrected satisfactorily	6
– too expensive	7
– repairman unhelpful/ unpleasant	8
– repairman did not keep appointment	9
– other reasons (specify)	10

4.20 (26) Was there a service contract for service after expiry of the guarantee? (circle number)

Yes	1
No	2
Don't know	3

4.21 (27) If yes, how was the contract offered to you? (By manufacturer, or retailer, or door-to-door salesman, or whoever, please specify.)

4.22 (28) What was the cost of the service contract? (please specify)

4.23 (29) Would you buy this brand of stove again? (circle number)

Yes	1
No	2
Don't know	3

5. OTHER INFORMATION

To assist us with the survey, could you please fill in the details below. You will remain anonymous, of course, as your name does not appear on the questionnaire.

5.1 (31) What is the total number of people in the household?

5.2 (32) How many of these people are employed?

5.3 (33) How many of these people are school children/students?

5.4 (34) Subscriber's sex (circle number)

Male	1
Female	2

5.5 (35) Respondent's sex (circle number)

Male	1
Female	2

5.6 (36) In which income group would your household be? (circle number)

Up to $5000	1
$5000 – $8000	2
$8000 – $12 000	3
Over $12 000	4

5.7 Town/suburb

Postcode

(37) (38) (39) (40)

THE GREAT AUSTRALIAN MEAT PIE

'When you sink your teeth into the meat
The heavenly taste throws you off your feet.
The gravy drips like liquid gold
Even if the pie is cold.
How can experts criticise
This god-given gift of Aussie pies.'

(Official poem of the Federation of Australian Pie Connoisseurs)

The Great Australian Meat Pie is dead—it has been succeeded by the Great Australian Gravy Pie. Do you remember those golden brown crisp pastry cases filled with great hunks of chunky meat—something you could really get your teeth into? Gone are those days. ACA has surveyed meat pies around Australia, and sad to say we had difficulty finding chunks of meat in the meat pies we bought.

Last year we looked at the humble beef sausage, and received a few shocks (see CHOICE, June 1975). Our meat pies examination has given us a few more. For instance, on a meat content per dollar basis the meat pie is three times more expensive than those soya bean protein adulterated sausages we reported on last year.

Time and time again ACA has been urged to test Australian meat pies, but there is no way we could make a full comparative test of all the different brands of pies on the market. Some are locally made in small shops and bakeries, others are mass-produced and sold extensively throughout the larger cities and may be distributed State wide. There is also, inevitably, a day to day variation so that the number of pies we would have to buy to get a representative sample would be immense. Although we have used average figures in this article in order to discuss meat pies generally, this in no way helps the person who happens to buy a pie with well below average meat contents. That person has every right to complain.

In this report we look at what goes into meat pies today, and at the legislation which controls their quality.

The legal pie

Legislation under the Pure Food Acts of the various States regulating meat pies is similar and generally takes the following form—

> 'Meat pie is cooked meat with or without cereal, condiments, seasoning and water, enclosed in a case of pastry.'

State legislation is also uniform in what it considers to be the correct proportion of meat in a meat pie—

> 'Meat pie shall contain not less than twenty-five parts per centum of meat. The meat so determined shall contain not more than thirty-three and one-third parts per centum of fat.'

Now, what most people might regard as meat is not quite what the law regards as meat. What we think of as meat is what the law calls 'meat flesh'. 'Meat' as defined by the law (and hence what manufacturers are allowed to put into meat pies) is defined much more broadly as—

> 'Meat is any edible part of any cattle (including buffalo), sheep, pig, rabbit, goat, or bird other than game, which is ordinarily used as food by man, whether fresh, chilled or frozen.'

In other words you can find almost any part of these or any other edible animals in a pie and it's quite legal.

What the average person regards as meat is legally called 'meat flesh' and is defined as—

> 'Meat flesh is the skeletal muscle of such animals or birds with or without the accompanying and overlying fat, together with the sinew, nerve and blood vessels that normally accompany the muscle tissue and are not separated from it in the process of dressing, but does not include the muscle found in the lips, snout, scalp or ear.'

So, unlike sausages, pies may contain any parts of animals ordinarily eaten as well as meat flesh. In addition, cereal, condiments and water may or may not be added. Aside from fulfilling these requirements on the meat and fat contents of a pie, anything goes.

What we bought

There are many meat pie manufacturers in Australia and only a few are national. To obtain a representative selection of Australian meat pies, we purchased from manufacturers in each State. All brands which were found in more than one State were included and the remainder were selected from those which were most readily available in each State. If a brand was available prepackaged and frozen, it was purchased in that form rather than loose and unfrozen. The rest of the pies were purchased individually. In all cases, plain meat pies without other flavourings and of the typical 'lunch time' size were bought. Unbranded pies from a pastrycook were bought for comparison. The brands we bought are listed in the Table.

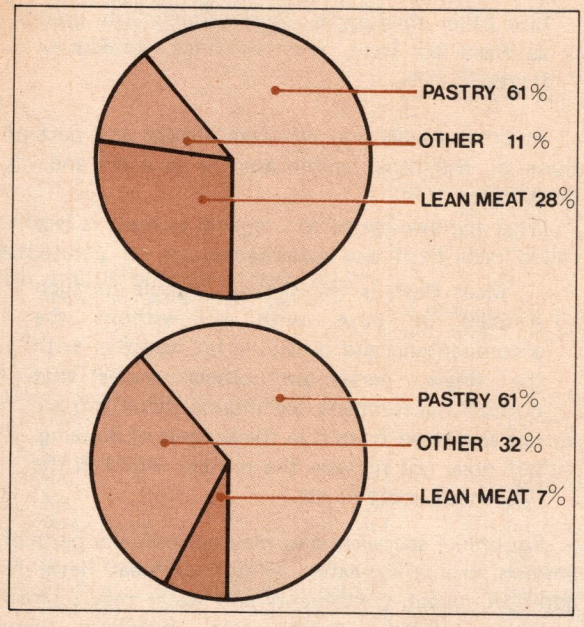
Prices ranged from 19 to 30 cents per pie and we bought at least eight pies of each brand at the same time.

How we tested them

We used three methods to determine the contents of the pies. The first was the standard analytical method on which the legislation is based. This test determines the total nitrogen content of the pie's filling. Nitrogen is a constituent of all protein (and of many other substances) and from the total nitrogen content a figure is calculated which is supposed to represent the protein content of the pie. Of course, any additive containing nitrogen will show up on this test as protein, whether it be soya bean, monosodium glutamate or urea. In other words, if a manufacturer wanted to save money and keep his pies legal, he has only to add a cheap non-toxic substance rich in nitrogen to satisfy current analytical procedures.

Our second test was to put the filling of each pie through a fine sieve and visually examine the meat caught in it. We weighed the 'meat' which was caught in the sieve and calculated the percent meat content for the pie.

Brand (state where purchased)	Measured mass (g)	Cost (cents)
ADAMS (Vic)	146	21.5
BADENOCH (SA)	133	20.3
BALFOURS (SA)	151	23.3
BANQUET (NSW)	145	20.0
BIG BEN (NSW)	129	19.8
BIG BEN (WA)	136	20.5
BUTTERCUP (NSW)	120	30.0
COOLEY (Tas)	175	25.0
FARMLAND (NSW)	165	21.3
FOUR 'N' TWENTY (Vic)	170	30.0
GIBBS (SA)	146	20.0
GOLDEN TOP (Qld)	175	30.0
H & H (Tas)	134	26.0
McKAY & BOYS (NSW)	144	27.0
MR SNOWMAN (NSW)	178	20.7
NATIONAL (Tas)	160	25.0
NOON (Vic)	163	30.0
PETERS (WA)	137	19.2
SCOTTS (NSW)	142	23.3
UNBRANDED (NSW)	128	27.0
WEDGEWOOD (NSW & Vic)	179	20.5
WOOLWORTHS (NSW)	134	19.8



The average proportion of lean meat to other ingredients in the pies we examined, as shown by total nitrogen analysis (top) and microscopic examination (bottom).

Our third test was to submit the pies to microscopic examination by a histologist to look for skeletal muscle tissue. If the protein content on the nitrogen analysis was high and there was little evidence of muscle tissue in the pie, we would assume that non-meat flesh nitrogenous substances were being used to boost the pie up to, or above, the legally required protein level.

We also conducted a taste test.

What we found

On the total nitrogen test, six of the 22 pies did not meet the legal requirements—their nitrogen content indicated that each of them had a meat content of less than 25 per cent. The six which failed fell short by up to five per cent. The average over all pies in this test indicated 27.6 per cent meat. So manufacturers' are keeping very close to legal requirements and sometimes drop below this. The fat content of all fillings was below the permitted maximum.

Sieving gave similar, but generally lower results. The average content was 20.7 per cent meat. In most cases there were very few chunks of meat. The pies were almost all gravy and we needed a fairly fine mesh sieve to retain the proportion of meat that we did.

The microscopic examination was made from stained slides prepared by thinly slicing samples cored from frozen pies. From these slides a specialist histologist was able to identify skeletal muscle tissue and estimate the amount present in the pie. This test does not give exact figures for the meat content, as some tiny fragments of meat and the gravy and fat components won't show up; the results were far lower than we expected, allowing for these factors.

The average muscle tissue was only 7.1 per cent of the total pie. Only two of the pies had anywhere near as much identifiable skeletal muscle tissue as they had meat, as indicated by the total nitrogen test. In fact most were much lower in meat content on this test, with one pie apparently having as little as 1.4 per cent lean meat flesh content. This brand of pie also had one of the lowest meat contents on our sieving test but still passed the legal requirements. The pie with the highest meat content for the test specified by the regulations had a very low meat flesh content when examined microscopically.

Clearly, as in the case of the sausages we examined last year, something is very seriously wrong with the traditional method for determining meat content in foods such as meat pies. There is also something wrong with the pies themselves, as the identifiable meat content was so low, even when assessed by the most reliable method of sieving out the meat particles from the gravy.

The comments arising from our taste-test panel were uninspiring. Most panel members didn't like most pies. Only a few were rated as quite tasty. Personal preference and taste will heavily influence the results of such a test, although it is interesting that the highest rated pie was the unbranded one from a local pastrycook and the lowest rated pies came from well known national brands.

Value for money?

In our tests we wanted to see if pie fillings meet the legal requirements. Whether they do or not, do they represent good value for money? We calculated the average price per kilogram for the meat content of an average meat pie based on the results of the total nitrogen test—which gives the most favourable result for the manufacturer. Even on this basis we found that the meat content of a meat pie was three times more expensive than the average price per kilogram for the meat in those adulterated sausages we tested last year. Clearly the meat pie is an extremely expensive way to buy meat, even if it is good quality meat. Yet the meat permitted in meat pies is of the lowest grade. Thus, although the actual price of a meat pie is low for a snack today, it represents very poor value for money indeed.

What to do?

ACA has called for a review of the method of determining the meat content of food in the past. Last year the Minister for Science and Consumer Affairs advised us that he had asked the head of his Department to direct the relevant officers to follow up this matter. The Department of Science is still investigating.

ACA now repeats that request. Legislation is urgently required to revise the means of testing for meat content in foods. The method based on total nitrogen is now totally inadequate to ensure that the consumer is really getting what he believes he is paying for. Checks made under a microscope to ensure that meat is really present, and protein identification checks, should be substituted for the current antiquated methods.

Under the current regulations there is no guarantee that the legal meat content is in fact meat at all. It could be any nitrogen-rich substance and it would satisfy the law. Nearly as bad a problem from the consumer's point of view is the meat which is permitted to be used in a meat pie. It can be almost

any part of cattle, sheep, pig, rabbit, goat or bird (other than game). The 'meat' in a pie certainly does not have to be what the ordinary person would consider to be meat.

ACA has proposed changes (see box) to the National Health and Medical Research Council's Standard for Meat and Meat Products which is used as a basis for legislation in New South Wales, Queensland, Tasmania and Victoria, but it may be a long time before the Council even considers our suggestions, let alone adopts them.

Conclusions

Once again, ACA has shown that the whole area of meat content in common manufactured food products like meat pies and sausages deserves closer scrutiny from the relevant health authorities. The standard test method on which the legislation is based is insufficient to protect the consumer from any manufacturer who might flout the regulations. It is a severe indictment of the food industry that legislation must now be improved to make it possible to determine whether meat is present in a pie and to prosecute if the meat content does not meet the requirements specified in the regulations.

No mention has been made of bacterial contamination as all pies would be sterilised by the cooking process. There is some danger of this however, when pies are reheated in warming cabinets.

Other convenience foods may cost more initially but you have a better chance of getting value for money. We say buy only foods you can identify. The toasted sandwich of grilled steak or chicken pieces are good examples.

An eminent dietician has told us that as a group Australians consume an excess of calories, fat, sugar and alcohol. A meat pie is a high calorie, high fat, low dietary fibre ('roughage') food with fat high in saturated fatty acids. The best meal nutritionally is the one which provides an appropriate level of calories for the individual, and at the same time makes a significant contribution to protein, vitamin and mineral needs. A lunch with as much protein, and far less fat and calories would be, say, a wholemeal salmon sandwich, an orange and a carton of skim yoghurt. This meal is similar in price to two meat pies and is considerably more wholesome. Weight watchers should note that two typical meat pies contain approximately 1140 calories, whereas the above sandwich lunch contains only 430 calories.

If you must buy meat pies, stick to those from small specialist shops which really do prepare their own. They will probably taste much better, and contain more meat, than their factory manufactured competitors. This is certainly more likely when dealing with a shop of this sort, which will normally take a measure of interest, or even pride, in selling a good product.

ACA's Suggested Amendments to the NHMRC Standard on Meat and Meat Products

ACA's suggested alterations are:—

1. The definition of meat should include the words 'in Australia', so that there can be no question that the meat is meat which is ordinarily eaten by man in Australia and that it does not include other meats that are not generally eaten in Australia, but are ordinary fare elsewhere.
2. The definition of meat flesh should specify that —

   'meat flesh is skeletal muscle, which has been dressed so as to remove as far as possible connective tissue and fat, but which includes the sinew, nerve and blood vessels that normally accompany the muscle tissue.'

   The other tissues permitted to accompany the skeletal muscle should be restricted to five per cent by weight. Our aim is to ensure that the meat flesh permitted in meat products should be the same as the meat which is sold as meat in a butcher's shop—and nothing more.
3. ACA has suggested that the word 'farinaceous' which could be interpreted to relate to flour made not only from corn or nuts but also to powdery substances from any source, should be replaced by 'flour made from wheat, barley, rice or oats'.
4. ACA would like to see nitrates and nitrites prohibited in sausages, where they are used as colour stabilizers, and reduced in manufactured meat products and corned, cured, pickled or salted meat.
5. We also think that the current Standard relating to sausage meat and sausages should be extended to cover the contents of sausage rolls, pasties, and any foods of which the contents are described by the adjective 'sausage' or 'meat' or any pastry encased meat products.

INDOOR SUNTAN PREPARATIONS

The recommended preparations.

Despite one of the highest skin cancer rates in the world, Australians continue to associate a suntan with health and beauty. For the sake of that "deep bronze even tan", we scorch, peel and risk serious trouble later.

Products that promise to tan without sun seem to offer all the social benefits and none of the danger, so ACA decided to test them.

What we bought

In an Australia-wide survey, we found a total of 20 products claiming to produce an artificial tan. We bought them all, at prices ranging from $1.49 for SUNDOWNER Indoor Outdoor and MARCHON Suntan Make-up Cream to $5.00 for HARRIET HUBBARD AYER Bronze Permanent. By shopping around, we made small savings on a number of brands and quite large savings on the three COPPERTONE products.

The preparations we bought were of three different types.

Sixteen products were colourless, or nearly so, when first applied, but claimed to develop, within a few hours, a natural looking tan capable of lasting for some days.

Two products were simply tan-coloured make-up which could be washed off with soap and water.

Two more combined both these functions and promised to hide a pale skin cosmetically while causing a more lasting tan to develop.

Packaging

Fake tans come in plastic squeeze bottles, metal tubes, plastic tubes and even, in one case, an aerosol can. Only one brand gave us trouble. We lost half the contents of a plastic bottle of MALIBU Rapid Tan Lotion when its nozzle section blew out under normal squeeze pressure. The same thing happened when we tested more bottles of the same brand.

How full is full?

Because it is often difficult to extract the last of a product from its container, we measured not only the average contents of packs of each preparation, but also the amount the user can expect to obtain. This 'available' content varies according to the heat of the day and the strength—or sheer

determination—of the user, so we used an average figure.

When we compared both these measurements with the amounts stated on the labels of the products, we found interesting contrasts between brands.

Some products contained the same or less than their labels stated. The available content was smaller still, so that in the cases of PISTACHE Double Exposure, PIZ BUIN Self Tan Instant Sun Make-up and PIZ BUIN Self Tan Milk, the consumer may lose by from 10 to 15 per cent.

On the other hand, some manufacturers packed more than they promised, so that the amount delivered to the user is approximately the same or even a little more than stated on the label. In this category were ELLEN BETRIX Ultrabraun, HARRIET HUBBARD AYER Bronze Permanent, MARY QUANT Topspeed Tan, SKOL Quick Tanning Cream, and SUNDOWNER Indoor Outdoor. ACA commends this approach.

Some brands whose stated contents were expressed in terms of mass rather than volume, could not be assessed as readily on this point.

As a rough guide to value for money, we have listed in the Table the cost per millilitre of each product. We based our calculations on measured total content to avoid complexity, so the results are approximations only.

Instructions and warnings

The products which promise to tan you for several days are not stains or dyes. They contain a chemical, dihydroxyacetone (DHA), which, through a complex reaction in the skin, causes a brown pigment to be produced. Because they can have this effect on any protein-based substance, it is important to avoid contact with blonde or grey hair and fabrics like nylon and wool. Only five of the brands we looked at made this clear.

How you apply the cream, lotion or foam is also important. Uneven application leads to a patchy tan, and some areas of the body darken more readily than others. These danger areas are the knees, heels, elbows, underarms, knuckles and between the fingers, so go lightly until you can see the result. Most brands mentioned the need for even application but 11 failed to warn about the variable effect.

Because almost any substance can be the cause of someone's allergic reaction, ACA feels that products intended for use over so much of the skin surface should advise users to carry out a preliminary patch test. Very few did so and seven brands gave no allergy warning of any kind.

A number of brands also claimed to be sunscreens for outdoor protection. We don't think you should use them for this purpose, as the browning effect may prevent your noticing sunburn until too late. You should also bear in mind that an artificial tan does not provide the partial protection against burning that a real tan gives.

The instructions that came with PIZ BUIN products implied that satisfactory results require 'before and after' use of other quite expensive products by the same maker. Since the before and after effects concerned are the removal of dead skin and the giving of longer life and sheen to your tan, we suggest that you may prefer to have a bath first and use any light oil on your skin afterwards.

We found the instructions that accompanied the make-up preparations adequate for their purpose.

Testing

In the sun, people of different colouring and skin type turn brown (or red) at different speeds and to varying degrees.

To help us evaluate the effects of indoor suntan preparations, we chose our test panel from volunteers who ranged from freckled redhead to naturally dark.

Then we applied equal amounts of each product in strips to the skin of every panel member.

The cosmetic tans could be judged for appearance immediately. Instructions accompanying most of the other products suggested several applications, so with these we repeated the process twice more during the following seven hour period. We exempted from the final application one fair-skinned panel member who always tans easily, as the effects were already dramatic.

Panelists were asked to rate each product for the depth of tan produced and the naturalness of the colour. They also looked for any irritation of the skin.

Over the following days, we monitored the rate at which each strip faded and tested the make-up preparations for staining of fabrics.

How well do they work?

Because personal taste plays a large part in the choice of any make-up, panel reactions to the appearance of the wash-off cosmetic tans were predictably mixed. Light-skinned panel members found MARCHON

Brand	Lowest price paid ($)	Average measured contents (ml)	Cost per ml (cents)	Test performance
Skin darkeners				
AMBRE SOLAIRE Bronz Up Lait	2.99	126	2.37	● ● ●
COPPERTONE QT	3.69	240	1.54	● ● ●
ELLEN BETRIX Ultrabraun	3.67	64	5.73	● ● ●
GILDA Sunlike	2.55	88	2.90	● ●
HARRIET HUBBARD AYER Bronze Permanent	5.00	45	11.11	● ●
MALIBU Rapid Tan Lotion	1.70	107	1.59	● ●
MARY QUANT Topspeed Tan	3.00	117	2.56	● ●
NAPRO Golden Tan	2.35	114	2.06	● ● ●
PISTACHE Double Exposure	2.50	119	2.10	●
PIZ BUIN Self Tan Creme	2.50	43	5.81	● ●
PIZ BUIN Self Tan Golden Liquid	3.00	109	2.75	● ● ●
PIZ BUIN Self Tan Milk	2.75	121	2.27	●
PIZ BUIN Self Tan Soft Liquid	2.75	104	2.64	● ●
SEA AND SKI Indoor Outdoor	3.55	235	1.51	● ●
SKOL Quick Tanning Creme	2.24	122	1.84	●
SUNDOWNER Indoor Outdoor Fast Tan	1.49	124	1.20	●
Tan make-up				
MARCHON Suntan Make-up Cream	1.49	96	1.55	+
PIZ BUIN Self Tan Instant Sun Make-Up	3.00	42	7.14	+
Combination products				
COPPERTONE Sudden Tan Bronzing Foam	2.24	105 g*	2.13c/g*	● ● ●
COPPERTONE Sudden Tan Bronzing Lotion	2.45	137	1.79	● ● ●

(the more dots the better)

\+ Results too subjective for evaluation.
* Valid measurement of foam in terms of volume not possible.

Suntan Make-up Cream unnaturally dark. Dark-skinned testers dismissed PIZ BUIN Self Tan Instant Sun Make-up as ineffective. Both were found satisfactory by a proportion of the panel. These two preparations—and also the staining ingredients of the combination products—may mark your clothes, but the colour washes out.

All the other tanning products we tested darkened the skin colour of at least some of our panel members, so they work, but to varying degrees. None caused any skin irritation and effects were strongest the day after application.

In the Table we have given each product a dot rating according to the number of panel members who found it effective, and according to their satisfaction with the appearance of tan.

If you tan easily in the sun, you will probably acquire a fake tan easily too, according to our results; so wait until you can see the effects of one application before putting on more. Those who suntan with difficulty, if at all, may find they need to make several applications. Don't expect the effect to be very noticeable if your colouring is naturally very dark.

Most people should reckon on renewing an artificial tan approximately every three days to maintain depth of colour, although you may be able to economise if you find, like one of our panelists, that your tan takes much longer to fade.

Conclusions

If you don't mind applying make-up daily, or you just want to look tanned occasionally, then choose a fake tan make-up by testing the colour on your skin before you buy.

For a longer lasting tan, we suggest that you choose from our list of recommendations. These are the products that worked best for most people. Although ELLEN BETRIX Ultrabraun also performed well, it is too expensive to be a good buy and has not been included.

The two combination products, COPPERTONE Sudden Tan Bronzing Foam and COPPERTONE Sudden Tan Bronzing Lotion, rated well and have the advantages of letting you see whether you have applied them evenly and providing instant colour.

Recommendations

Skin darkeners

AMBRE SOLAIRE Bronz Up Lait	$2.99
COPPERTONE QT	$3.69
NAPRO Golden Tan	$2.35
PIZ BUIN Self Tan Golden Liquid	$3.00

Combination products

COPPERTONE Sudden Tan Bronzing Foam	$2.24
COPPERTONE Sudden Tan Bronzing Lotion	$2.45

Pre-publication check

Prices for most of the recommended brands have remained steady since we first bought them, but during our last minute check we were unable to find COPPERTONE products at their earlier bargain prices.

COPPERTONE Sudden Tan Bronzing Foam had jumped in price to $3.30 and COPPERTONE Sudden Tan Bronzing Lotion was $3.03.

the pitfalls of making your own will

Many sensitive people are reluctant to make a will, feeling that to do so brings them one step nearer the grave. But if you wish to be the person to decide just how your property will be distributed after your death, then it is necessary to make a will.

In this report ACA looks at the reasons for making a will and the problems involved if a person attempts to draw up his own will or use a standard printed form.

Why have a will?

If you die without a will (intestate) the law prescribes the way in which your property is to be distributed. If this distribution is exactly what you want then there would be little need to make a will to alter it. But, unfortunately, the rules of distribution on intestacy are seldom adequate.

In all States (except Western Australia), if you die intestate without leaving a surviving spouse or children, your property goes first to your parents or, if your parents are dead, to your brothers and sisters and either the children or other surviving issue of any brothers or sisters who have died

before you. After this, the law in each State varies—in some your property goes to your closest relatives no matter how remote they may be, while in others the line of succession is comparatively short. In New South Wales, for example, if you leave no grandparents or uncles or aunts, your property goes to the Crown—even first cousins do not inherit.

One of the most common reasons given for not making a will, particularly by younger people, is that they 'have nothing to leave'. Most people today have some assets and, if you think about it, you probably own some personal possessions and perhaps a bank account and an insurance policy, as well as moneys that will come to your estate on your death, such as holiday pay, long service leave entitlement and income tax refunds. As well as this, there is always the possibility that you will suddenly acquire some assets—and if you die unexpectedly without a will, the result will almost certainly not be what you would wish.

It is even more important to make a will if you are married. The laws vary from State to State; in Victoria and Tasmania the surviving spouse will get the whole estate, but in other States he or she will get only a lump sum prescribed by law (varying from a maximum of $50 000 in the Australian Capital Territory to $6000 in New South Wales), plus half the balance of the remaining estate. The other half of the estate will be distributed according to the rules of distribution and it may be that a fairly distant relative will inherit—and finding out just who it is can waste a lot of the value of your estate. One cannot blame a wife for being aggrieved as well as grieved under these circumstances.

It may be even worse if you leave a wife and a couple of young children. Depending on the State law, the wife will either take a lump sum plus a third of your estate, or just a straight third, with the balance being held in trust for the children until they are of age. A single parent may find it difficult to bring up children in these circumstances.

Another disadvantage of not making a will is that you cannot appoint an executor. An executor is the person who looks after your estate when you are dead, and does the necessary work involved. It is usual to name in your will a person you can trust to do this for you, and who is suitable. If you die without a will, the person who administers your estate is appointed by the Court, and it is usually one or more of your next of kin—but not necessarily those you would consider best suited for the job.

How to make a will

In spite of what has been said so far, it is almost better not to leave a will at all than to leave a bad one and, for this reason, it is desirable to have your will drawn up by a solicitor.

'I only want a simple will. I can easily do it myself and save solicitor's costs', are words which are apt to make a lawyer rub his hands in delight at the thought of the costs that the profession will eventually collect from the long and expensive litigation likely to result from a 'simple will'. Indeed traditionally the first toast at a legal dinner is 'to the man who makes his own will'.

Some wills may be less complicated than others, but a will is a legal document and as such is never simple. Some of the standard printed will forms, readily available for a very small sum, themselves contain serious errors of law, as do certain magazine articles, which often contain statements which are only applicable to one State and so are wrong for others.

There are two main areas in which difficulties arise, even in the most uncomplicated of wills. First, there are a number of formalities which must be followed when making a will:

- The testator (that is, the person making the will) must sign the will at the end.
- The testator must sign in the presence of two witnesses—both present at the same time. These witnesses should not be persons who are to benefit by the will (or the husband or wife of any such person)—they lose the benefit if they are.
- The witnesses must then sign in the presence of the testator and of each other. They do not have to read the will or know what it says.

This does not sound very difficult, but if these rules are not strictly observed or cannot be proved, the will will not be accepted as a legally valid document and the estate will be distributed as if the will had not been made.

There are also other matters which the law does not prescribe, but which may cause difficulties. For example, it is desirable that the signatures of the testator and the witnesses should all be signed with the same pen. If this is not done it raises an obvious doubt that the required formalities were observed. The witnesses chosen must also be competent (that is, not suffering from any mental disability) or the will will fail.

It may seem hard that the slightest formal slip may cause a

will to fail, but the strict legal requirements in this area are designed to prevent any fraud. The law seeks to guard against the possibility of your will being altered without your knowledge, and if in some cases the results are unjust, in the majority they do serve to ensure that a person's last wishes are carried out.

The second main area of difficulty is the interpretation of wills. Since 1540 when a man was first permitted to dispose of his land by will in England, judges have been deciding what testators mean when they say certain things. Consequently, there are now a number of words and phrases which have a clearly recognized legal meaning which may not be at all what was intended by a layman when he wrote his own will. Some examples of these are:

- The word 'issue' is frequently used by a testator who intends to refer only to the children of the beneficiary, but in fact the word refers to all the lineal descendants of that person, no matter how remote.
- Words of relationship are strictly interpreted by the Court. For example, a person who wishes to benefit his cousins' children and leaves his property to his 'second cousins' benefits an entirely different group of people from his first cousins once removed.

Other words used by testators are just as uncertain and a good example of this is the word 'money'. Although the Courts will endeavour to give the word in the particular will before them a meaning which they think the testator intended, it has been interpreted as meaning only cash in hand in some cases, and in others to pass the whole of the testator's estate, including land.

Again, there can be problems concerning gifts with conditions attached, for example if someone dies having made a will leaving '$500 to Mary Smith when she attains the age of 21 years' and Mary Smith dies before she reaches 21, does she lose her gift, or has she had a right to it ever since the testator died, but could only actually receive the money when she turned 21? It will depend on how the Court interprets the words.

Other problems arise where gifts are made to a group of people by description rather than by name. A bequest 'to all my grandchildren' is probably intended to benefit the children of the testator's children, whenever they are born, but in fact his estate will probably pass only to such of his grandchildren who are alive at the date of his death and not to any grandchildren who may be born after his death.

On the other hand, you may not have any close relatives at all and may wish to leave your property, or part of it, to some organization with which you have been closely associated during your life, possibly for some particular project or purpose which is dear to your heart. The potential legal pitfalls of these sorts of bequests are so many and complicated that an article of this length cannot possibly begin to enumerate them. Suffice it to say that professional advice should always be sought about gifts to clubs, associations, societies, institutions and the like, and even then it may not be possible to achieve the exact purpose you have in mind.

Conclusions

If you wish to be the person to decide how your assets are distributed, then it is essential to make a will specifying the manner in which your property is to be dealt with in the event of your death. In order to avoid unnecessary complications for your executor and beneficiaries, your will should be drawn up by a solicitor.

Furthermore, once having done this, you should not forget that circumstances may change and that you should check your will from time to time to make sure that it still represents your last wishes and that no alterations are necessary. But never seek to make an alteration by writing anything on your will; always make a new will or have a codicil drawn up to cover the changes you wish to make. Remember, too, that marriage revokes a will (although divorce does not) so you must make another if you marry or you will die intestate. You should want to do so anyway, for marriage is one of the changes in circumstance which make it essential to reconsider testamentary gifts.

Sulphur content of kerosene — new figures

In our recent report on kerosene heaters (CHOICE, May 1976) we stated that the levels of sulphur in leading brands of kerosene varied from 0.5 to 1 per cent. The analysis on which these figures were based was carried out by an independent laboratory registered by the National Association of Testing Authorities, and has been checked again. A further analysis of samples from the same batches of kerosene originally analysed has given levels varying from 0.06 to 0.12 per cent. Current specifications call for a maximum sulphur level of 0.05 per cent.

photographic developing kits for the beginner

Almost every family has a camera of one sort or another and most of us are familiar with the basic photographic process, but in order to learn more about the hobby side of photography you must really try it for yourself. For the keen photo hobbyist who wants to explore the world of darkrooms, chemical formulae and the often exciting emergence with a dripping wet print, the best way to start is by developing his own black and white films.

ACA has looked at home photographic developing kits suitable for beginners. There are only a few specifically pre-prepared kits on the market although all the items needed are widely available in specialist photo stores throughout the country.

'In your own home' film processing can be fun and very interesting and is simple enough to do if you follow the directions carefully. Your primary reason for taking it up would have to be interest and a desire for quality, unless you have many films to develop. The commercial processing laboratories offer comparatively quick, competitive and cheap services, and we found that you cannot compete economically with them by doing it yourself on a small scale.

What we bought

We found only three branded kits. The most readily available was PATERSON Photo Lab Developing Outfit, followed by JOBO Foto Labor and DELUXE Photo Hobby Outfit. In addition, we had two kits made up for us by individual dealers as a comparison with the branded kits. We asked these dealers to provide a kit of their own selection suitable for a beginner. We think that the following items represent the basic minimum for developing black and white films—developing tank, graduated measuring cylinder, photographic thermometer, two film clips, sufficient developer and fixer chemicals to process at least one roll of film, a photographic sponge and a suitable instruction booklet. The Summaries show what we got in each kit.

Instructions

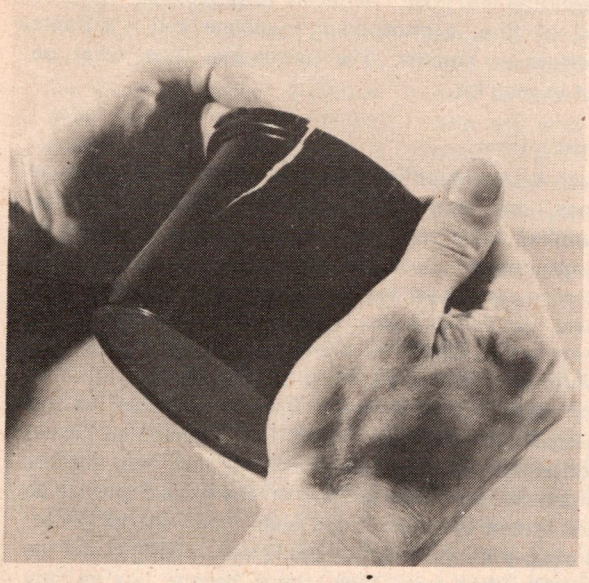
Each kit was supplied with a good and comprehensive book of instructions, except DELUXE which supplied only very basic instructions. You need to know not only how, but often why, a particular thing is done, and how to deal with problems when they arise, so detailed instructions are important. Since there are a number of brands and types of black and white film on the market a table of developing times for each of the different films is desirable. In this respect, PATERSON Photo Lab Developing Outfit contained the most useful information. Any number of books have been written on the subject and we do not intend to review them here. Your district library probably contains a comprehensive selection and we suggest that you look there before buying any expensive books.

Testing

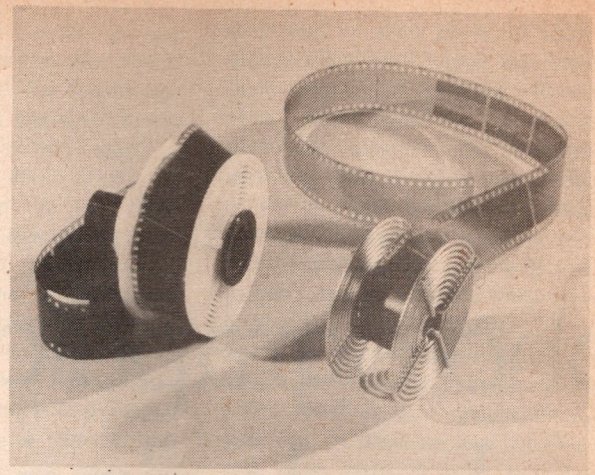
We tested the kits by identically exposing five rolls of film under varying conditions (including deliberate under- and over-exposure), using each kit to develop one roll of film and following the supplied instructions precisely. We then rated the negatives which were produced. We also rated the various components such as tanks, spirals, thermometers and chemicals for ease of use and replacement. We drop tested the empty tanks to evaluate their resistance to wear and tear.

Film spirals

We found all the plastic spirals were easy to use when dry but occasionally jammed when wet, while LPL stainless steel spiral was harder to learn to use initially but, with practice, could be loaded when wet with no difficulty. If you intend to process more than one roll of film in a session this could be important. The plastic spirals were all adjustable to suit different film sizes, whereas LPL stainless steel type was only suitable for one film size (35mm). This wouldn't make much difference unless you own cameras which use different size films. Looking to the future, JOBO plastic spiral, LPL stainless steel spiral (from the photo store kit) and the PATERSON plastic spiral could all be used for the reversal processing of colour film should you want to graduate to this more complicated process later.



DELUXE plastic developing tank fractured when dropped.



A plastic film spiral (left) is loaded from the outside towards the centre; a stainless steel spiral (right) is loaded in the opposite direction, from the centre outwards.

Developing tanks

The developing tanks were of various sizes, depending on the number of different size films which they could accommodate, and so used differing volumes of working solution to develop similar size films. The minor differences in economy caused by this feature are almost negligible compared with the cost of the chemicals or the kit in the first place. It was easy to load the spirals into the tanks in all cases. The plastic tanks had positive locking lids which didn't leak when inverted (there was no cap with DELUXE tank, which is not an inversion type tank and can only be used with agitation). The LPL stainless steel tank had a good friction fit lid and cap.

With complex chemical reactions occuring during the developing process, it is important to keep the period of developing as close to the manufacturer's recommended times and conditions as possible. Unevenly developed, over-developed or under-developed negatives may result if timing, temperature and agitation procedures are not strictly adhered to. A developing tank should therefore be fast filling, rapidly draining and easy to agitate. The combined time taken to fill the tank with developer, to empty it and fill it again with stop bath or water must not represent a significant proportion of the recommended processing time, otherwise some parts of the film will be immersed in the chemicals for longer than others—which could seriously degrade the negatives. In this respect, the LPL stainless steel tank and PATERSON System 4 plastic tank were the best,

and DELUXE was inadequate, as it was slow to fill and empty. JOBO System 1000, plastic tank filled quickly, but didn't empty quickly and tended to dribble.

It is possible that you might drop a developing tank while handling it, and to see how durable our kit tanks were we dropped each of them onto a vinyl covered floor from a height of one metre. The DELUXE and PATERSON System 4 plastic tanks were made of a brittle plastic and they fractured on impact, while the JOBO System 1000 plastic tank and LPL stainless steel tank were unaffected.

Chemical solutions

All the packaged chemicals, both developers and fixers, contained specific directions for mixing. These directions varied from adequate for GAF Vividol (from the DELUXE kit), KODAK developers and fixers, and ILFORD Hypan Rapid fixer (from the photo store kit), to good for PATERSON Acufix fixer, and very good for PATERSON Acutol FX-14 and TETENAL Leicanol (from the JOBO kit) developers.

Some chemicals were supplied as powders, others as liquids. All required dilution or mixing with water before use. The volumes of working solution when made up varied greatly with the concentration of the supplied chemicals. In this respect JOBO Foto Labor kit was better than the rest in that it indicated just how many rolls of film you could expect to process with the chemicals provided. PATERSON Acutol FX-14 developer was of the 'throw away after use' type which gives more consistent results, whereas all the other developers could be reused a number of times, with appropriately extended development times. The only developer of this type which gave the extended development times per roll of film was TETENAL Leicanol developer. However, repeated use of developing solutions and consequent extended development times is false economy when developing single rolls of film.

Three developers required mixing in hot (50°C) water—KODAK, TETENAL Leicanol and GAF Vividol developers. This presents some inconvenience as you must wait for them to cool to around 20°C before use.

Photographic developers oxidise easily and they should be stored in brown bottles with no air space, if possible. The liquid chemicals are easier to use. Those supplied in this form were ILFORD Hypan Rapid fixer, and PATERSON Acutol FX-14 developer and Acufix fixer. PATERSON chemicals were supplied in brown glass bottles, which could break if dropped, while ILFORD Hypan Rapid fixer was supplied in a plastic bottle.

The manufacturer's directions on how to prepare the solutions must be closely followed, as water which is too cold will result in slow dissolution, and water which is too hot may spoil the solutions. Never violently shake developing solutions when mixing as they rapidly deteriorate when exposed to excess oxygen. Rather, stir slowly until the chemical is completely dissolved.

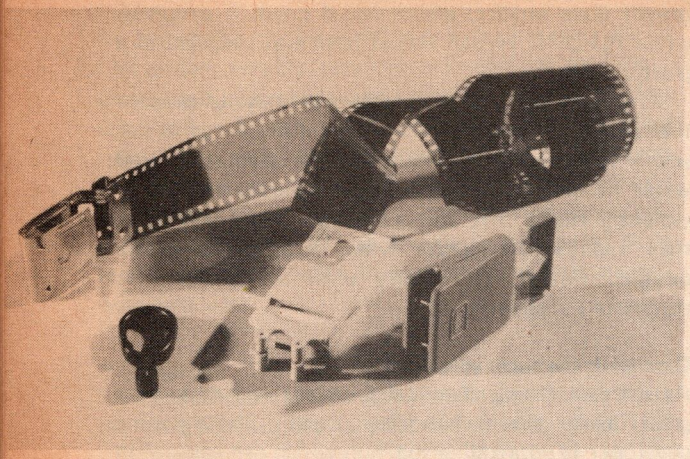
Care with chemical solutions

As with all strong chemical solutions you must take great care when handling them. Photographic developer is an alkaline solution which can cause skin irritation. When handling developer you should avoid contact with the skin, splashing it in your eyes, breathing in the powder or swallowing the solution. GAF Vividol, KODAK, and PATERSON Acutol FX-14 developers all carry warnings to this effect. Metol is a constituent of most developers and it can cause allergic dermatitis in some sensitive individuals. Developers also stain clothing, and ACA advises wearing an apron or old clothes when developing films.

Fixer is an acid solution and can bleach clothing. Only KODAK Fixer carried any warnings on the packet and these were: 'CAUTION: IRRITANT. Avoid contact with skin and eyes. Avoid breathing dust', and 'Do not use galvanised iron, aluminium, tin or copper receptacles for chemical solutions. Use stainless steel, Iconel, glass, hard rubber, enamel or glazed earthenware'. Many tanks and trays which will be used with this chemical are made of plastic. We think KODAK should update their warning to include certain plastics. We do not expect any of the chemicals to stain modern domestic hand basins or sinks as used in bathrooms, kitchens or laundries, but they will remove chrome plating and rust domestic stainless steel, so you should be careful to clean up all spilt chemicals immediately. Be careful not to get any fixer solution mixed with the developer or spilt on the film until after it has been fully processed in the developer.

Replacement chemicals

You will obviously want to use your kit more than once or twice after you have purchased it, so it is essential to be able to obtain replacement chemicals. Unfortunately the chemicals supplied with both DELUXE Photo Hobby Outfit and JOBO Foto Labor are available only in the kits and nowhere else. This is



The different types of film clips supplied with the kits.

only a minor problem, however, as competing brands of developer or fixer can be used interchangeably with little or no difference in the resultant negatives. This must not be taken to indicate that you can mix these chemicals together, but simply that when you have run out of one you can use another in its place.

A number of photographic chemicals generally available are suitable replacements for those supplied in the kits:

Developers

ILFORD ID-11
KODAK D-76
PATERSON Acutol FX-14

Fixers

ILFORD Hypan Rapid fixer
KODAK hardening fixer
PATERSON Acufix

Results

All the developers produced reasonable negatives, but in order to achieve this result care must be taken to maintain the correct time-temperature relationship, particularly while the film is in the developer. Also, the work space and all containers used must be kept scrupulously clean, otherwise you could end up with poor results. Dust is a particularly virulent enemy of good negatives, and you should be careful to dry the film in dust free conditions. A wetting agent, such as mild detergent, helps drain water droplets from the film surface, and is a useful drying aid.

Extras

All the kits were supplied with the basic minimum of equipment to develop films, except KODAK which didn't include film clips and the Photo store kit which didn't include a photographic thermometer, which we consider to be essential. DELUXE Photo Hobby Outfit also included the following items for producing contact prints—stainless steel tongs, three trays, photographic paper, contact printing frame and print roller. These would only be of use to make contact prints if using one of the larger format films like 120. JOBO Foto Labor included a plastic funnel which is a useful item for filling bottles, and a bottle of wetting agent. PATERSON Photo Lab Developing Outfit included a force film washer, which is attached to a tap and is used to flush washing water through the developing tank. This worked well in practice but unfortunately it doesn't fit onto all modern domestic taps. This kit also contained a useful and very effective film wiper but we do not consider this to be essential. Provided a wetting agent is used, wiping is unnecessary. For an extra $5.74 on top of the price of the basic kit, KODAK supplied plastic printing tongs, Brownie safelight, two photographic printing trays, a sponge and photographic paper. These are not much use without an enlarger or printing frame, although with a little ingenuity you could make contact prints. The only extra to come with the photo store kit was the PATERSON film wiper.

Economy

Based on the cost of the JOBO Foto Labor and replacement chemicals, we estimate that you would have to develop approximately 68 rolls of film before your cost per roll would fall below the commercial processing price of about 45 cents per 36 exposure 135 roll. Clearly, you do not buy a kit to save money. However, as the years go by you could get the cost of developing a roll of 35 mm black and white film down as low as 10 cents.

Conclusions

There are at least three home photographic developing kits on the market but they are all more expensive than making up an equivalent kit from separate components.

The product finish and general quality of DELUXE Photo Hobby Outfit was not as good as for the other kits and, considering its high cost, we cannot recommend it. JOBO Foto Labor had good instructions and durable components; it was easy to use and we recommend this kit. Several components of PATERSON Photo Lab Developing Outfit were brittle and could be easily broken, but otherwise it had much to recommend it.

The shop prepared kits were very similar and both

were cheaper than the branded kits. Your best choice would be to select the best of the individual components and have a kit made up to your specifications. We suggest:

JOBO System 1000 Developing tank and film spiral ($13.83),
KODAK Volume Measurer (75 cents),
KODAK Photographic Thermometer ($1.81),
KODAK D76 developer (48 cents),
ILFORD Hypan Rapid Fixer ($1.50),
Photographic sponge (52 cents),
(Paper clips for use as film clips, detergent as wetting agent, and a funnel should be available as household items.)

Individual prices may vary from store to store but a total of about $20.00 is indicative of the price you can expect to pay. The chemicals were selected on the basis of economy, suitability and availability.

Recommendations

JOBO Foto Labor $24.95
Or a kit made up to your own specifications, which should cost about $20.00.

Pre-publication check

JOBO Foto Labor kit was unchanged in price when we did our pre-publication check.

SUMMARIES

DELUXE Photo Hobby Outfit $31.46

Kit contents: Plastic developing tank and film spiral; measurer; thermometer; four plastic film clips; stainless steel tongs; three plastic trays; 25 sheets photographic paper for contact prints; metal print frame; print roller; instruction booklet; GAF Vividol developer; GAF Fixing hypo

Number of films processed by kit: 6 135 size (35 mm)

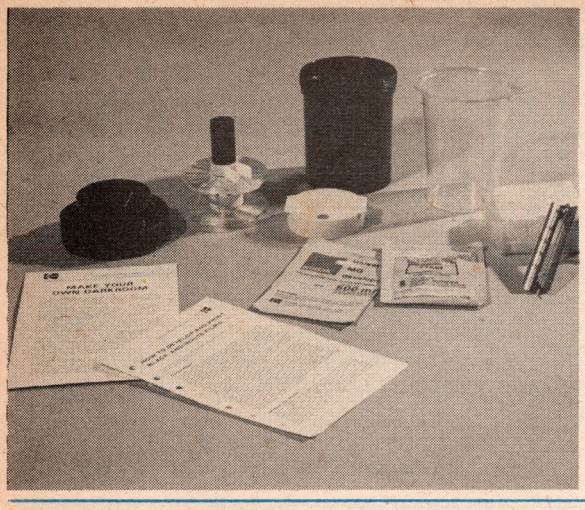
Stated film sizes processed by kit: 135 (35 mm), 127, 126, 120-620, 116-616 and 828

JOBO Foto Labor $24.95

Kit contents: JOBO System 1000 plastic developing tank and film spiral; measurer; thermometer; two plastic film clips; plastic funnel; instruction booklets; wetting agent; TETENAL Leicanol developer; TETENAL Fixiersalz

Number of films processed by kit: 10-12 135 size (35 mm)

Stated film sizes processed by kit: 135 (35 mm), 127, 126, 120 or 220, and 16 mm



KODAK prepared kit $17.69

Kit contents: JOBO System 1000 plastic developing tank and film spiral; measurer; thermometer; sponge; instruction booklets; KODAK Universal MQ developer; KODAK fixer

Number of films processed by kit: 2-6 135 size (35 mm)

Stated film sizes processed by kit: 135 (35 mm), 127, 126, 120 or 220, and 16 mm

PATERSON Photo Lab Developing Outfit $29.75

Kit contents: PATERSON System 4 plastic developing tank and film spiral; measurer; thermometer; two plastic film clips; force film washer; film wiper; instruction booklets; PATERSON Acutol FX-14 developer; PATERSON Acufix fixer

Number of films processed by kit: 6 135 size (35 mm)

Stated film sizes processed by kit: 135 (35 mm), 127, 126, 220 or 620

Photo store prepared kit $24.40

Kit contents: LPL stainless steel developing tank and film spiral; measurer; two stainless steel film clips; film wiper; instruction book; KODAK Universal MQ developer; ILFORD Hypan Rapid fixer

Number of films processed by kit: 2-6 135 size (35 mm)

Stated film sizes processed by kit: 135 (35 mm) only

Jottings

Namco kitchen step-stool

Our attention has recently been drawn to a kitchen step-stool which appears, because of its design, to be potentially dangerous. A member has claimed that the steps of the stool, which is manufactured by Namco Industries (N.S.W.), are hinged in such a way that a person standing on them in a particular position could be unbalanced.

We bought one of these stools to see just how safe they are. Unfortunately, the original model had been superseded, but the design of the new version was basically the same and our findings hold equally for both models.

The steps tipped forward slightly if stepped on in a certain way.

In practice, the fold-out steps could be made to tip forward if they were stepped on in a certain way, although this movement was slight and, in normal use, is seldom likely to occur. In fact, when stepped on firmly and squarely the steps felt quite stable.

Elderly people could conceivably find the stool hazardous, and not necessarily because of the steps alone—the soft top of the stool is not an ideal surface to stand on—but for normal use we consider the unit to be adequately safe. A simple solution to the problem of step movement would be for the manufacturer to fit a clip to the stool frame so that the steps can be locked in the unfolded position.

A & R car converter

The A & R Car Converter is used for powering portable tape recorders and similar electrically operated devices from a car cigarette lighter socket. A member wrote to us telling of his disappointment with the operation of this converter and ACA subsequently examined it. Our member had complained that this make of converter had caught fire and melted without the slightest provocation in three different brands of car.

We found that electrically the unit was sound, but that mechanically it was poorly constructed. The two metal contacts which connect to the cigarette lighter socket may short circuit and draw a very large current from the car battery. This can cause overheating of either the converter, the lighter socket, or the car wiring. In an extreme case fire could result.

If you are thinking of buying a converter of this sort, we advise you to consider carefully before choosing. There are several other brands on the market which we haven't tested. What you must be sure of when buying is that the converter can handle the current drain of the devices you intend to power with it.

A NOTE ON RENEWALS

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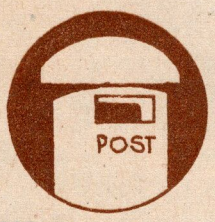

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